BLM LIBRARY
88079059

LIBRARY COPY

Historical Survey of the Socorro District

BLM RECEIVED
FARMINGTON
MAR 1 9 1976

AREA MANAGER
OPERATIONS
FILE

By: Alvin Sanders
Bureau of Land Management
— Socorro District

F
802
.S6
S263
1976

Resources Development Internship Program
Western Interstate Commission for Higher Education

This report has been catalogued by the WICHE Library as follows:

Sanders, Alvin L. Jr.
Historical survey of the Socorro District / by Alvin L. Sanders, Jr. -- Boulder, CO : Western Interstate Commission for Higher Education, 1976.
113 p.

1. Socorro, NM - Antiquities. 2. Socorro, NM - History. I. United States. Bureau of Land Management. II. Western Interstate Commission for Higher Education. Resources Development Internship Program. III. Title.

The ideas and opinions expressed in this report are those of the author. They do not necessarily reflect the views of the WICHE Commissioners or WICHE staff.

The Resources Development Internship Program has been financed during 1975 by grants from the Economic Development Administration, the Jessie Smith Noyes Foundation, the National Endowment for the Humanities, the Wyoming Office of Manpower Planning; and by more than one hundred and fifty community agencies throughout the West.

WICHE is an Equal Opportunity Employer.

#2417067 ID: 88079059

F
802
.S6
S263
1976

LIBRARY COPY

HISTORICAL SURVEY OF THE SOCORRO DISTRICT

by

Alvin L. Sanders, Jr.

PROPERTY OF
USDI-BLM

Sponsored by the Bureau of Land Management
Socorro District Office
Socorro, New Mexico

Project Committee Members:
Gary Davis
Paige W. Christainsen

February, 1976

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

Contents

	Page
Acknowledgments.	ii
Abstract	iii
Introduction	2
Indian History	8
Spanish Influences	16
The Mexican Period	30
The American Period	34
The Livestock Industry	52
Transportation	58
Agriculture	66
Water Control	73
The American Quest for Water	80
Planning Considerations	86
Map of Socorro District Location	1
Map of Indian Cultures	7
Map of Spanish Exploration Routes	15
Map of El Camino Real	24
Map of Mining in the Socorro District	42
Bibliographic Essay	91
Bibliography	95
Appendix A - National Historic Register Sites Socorro District	101
Appendix B - Personal Interviews	104

ACKNOWLEDGMENTS

I would like to thank all the people I interviewed for taking the time to help me gain some knowledge of the history and folklore of the area; the personnel of the Coronado and Zimmerman libraries of the University of New Mexico, Martin Speare Memorial Library of New Mexico Institute of Mining and Technology, New Mexico Bureau of Mines and Mineral Resources, Socorro Public Library, the Socorro District Office of the Bureau of Land Management and Statistical Reporting Service of the United States Department of Agriculture for their assistance in helping me research this project. My particular thanks to Mr. Gary Davis and Dr. Paige Christiansen, without whose help the project could not have been completed. Also, thanks to Alice Martinez for her very capable assistance in preparing and assembling this report. And, lastly, my appreciation to the Western Interstate Commission for Higher Education (WICHE) for providing the internship that enabled me to undertake this interesting project.

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

ABSTRACT

The purpose of this report is a general historical survey of the ruins and sites of human habitation of the Socorro District of the Bureau of Land Management, United States Department of the Interior, during the many generations of different cultures that have lived in the district. In order to provide a general background leading up to some specific sites and details, it has been necessary to discuss some areas outside the district.

This general survey is by no means a complete history of the district but is rather an attempt to gather into one short paper some of the most essential information contained in numerous books, publications, papers and unpublished manuscripts for further historical investigations.

Since many of the historical sites have been, and are still being, subjected to vandalism by curiosity seekers and souvenir hunters and have suffered some damage from home construction and farming operations, the report is intended to convey a sense of urgency in identifying and protecting as many sites as possible. Many sites can be protected or restored and the area surrounding them preserved or restored to its natural state.

There is very little said about the historical sites in the town of Socorro in this report. The Socorro County Historical Society is very active and has already issued publications that deal with

many such sites. Many of them have been, and more are going to be, recommended by that society for inclusion in the National Register of Historical Places and there is no reason to repeat them in this report. The Catron County Historical Society is also becoming very active.

A map of historical sites and the legal location of them is not included in this report as previous general distribution of such information has led to an increase in vandalism. Anyone having a genuine need of such information may contact the Socorro District Office, Bureau of Land Management, Socorro, New Mexico.

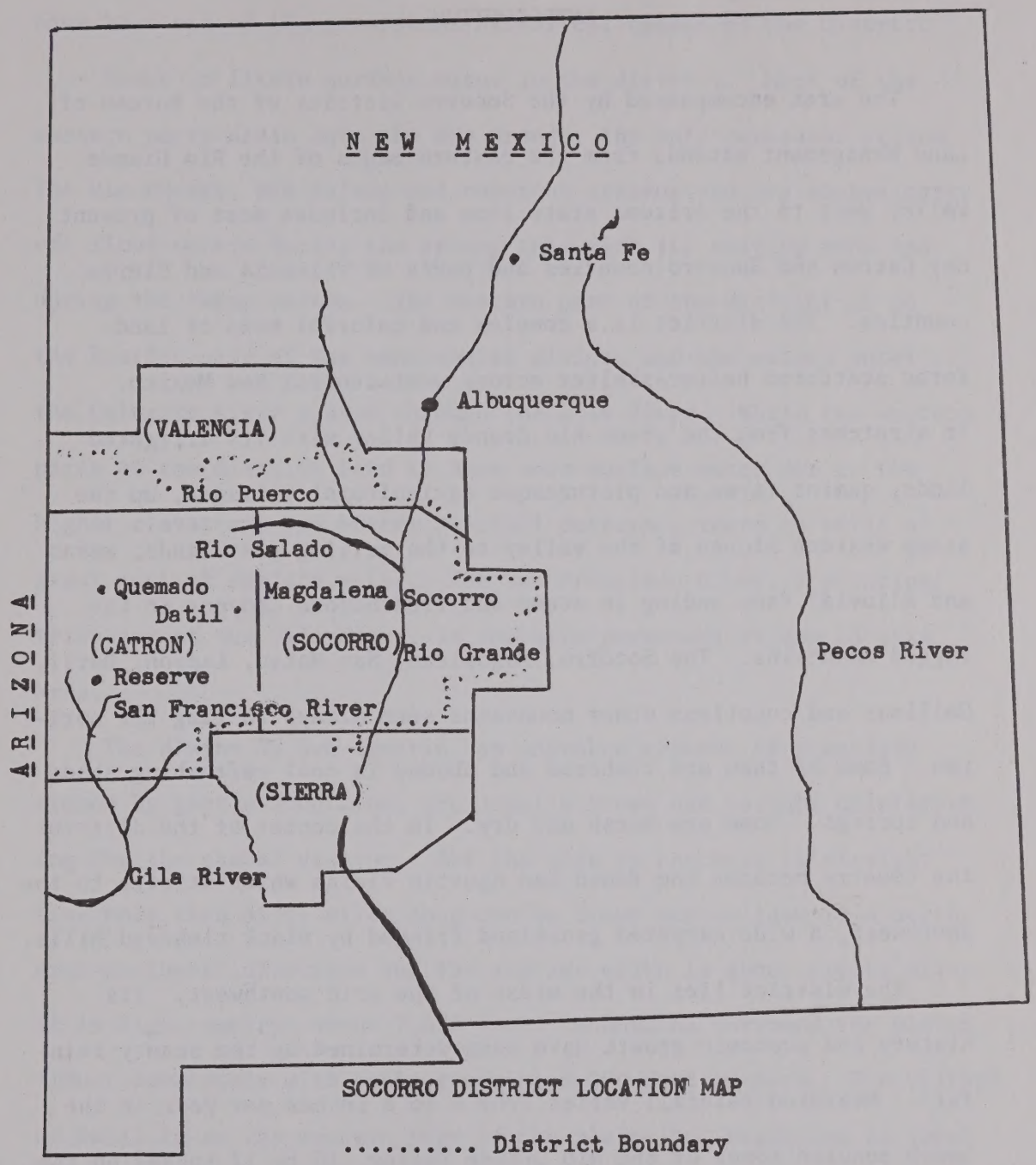
Also, an effort has been made to develop some social and economic trends in connection with the following themes:

1. The cattle and sheep industry.
2. Transportation and mining.
3. The military and Indians.
4. The importance of water.

Thus, the report covers an extended period of time - from the prehistoric to the present - and had to be very broad in nature. It is only a beginning. I have only scratched the surface and the report is not intended as a complete history of the general or specific areas covered.

Information was obtained from personal interviews, general discussions with persons having a knowledge of Southwestern history and folklore, library research and field work. Some of the infor-

mation obtained from personal interviews and general discussions developed differences and/or contradictions with information obtained from library research and field work and allowances have been made as most of those interviewed are two or more generations away from the actual event(s). But to hear their stories is an opportunity to gain a very real insight into the trials and tribulations of both the early and late settlers of the district.



SOCORRO DISTRICT LOCATION MAP

..... District Boundary

_____ County Boundaries

INTRODUCTION

The area encompassed by the Socorro District of the Bureau of Land Management extends from the eastern edges of the Rio Grande Valley west to the Arizona state line and includes most of present day Catron and Socorro counties and parts of Valencia and Sierra counties. The district is a complex and colorful mass of land-forms scattered helter-skelter across west-central New Mexico. It stretches from the green Rio Grande Valley with its irrigated lands, quaint farms and picturesque agricultural villages, up the steep western slopes of the valley to the rolling grasslands, mesas and alluvial fans ending in steep and treacherous canyons in the rugged mountains. The Socorro, Magdalena, San Mateo, Ladron, Datil, Gallinas and countless other mountains seem always to ring the horizon. Some of them are timbered and abound in cool refreshing shade and springs. Some are harsh and dry. In the center of the district the country becomes the famed San Agustin Plains which stretch to the southwest, a wide carpeted grassland fringed by black timbered hills.

The district lies in the midst of the arid southwest. Its history and economic growth have been determined by the scanty rainfall. Measured rainfall varies from 6 to 8 inches per year in the harsh sonoran zones of the Rio Grande Valley, 10 to 12 inches on the higher mesa grasslands, to 30 inches or more on the high mountain forests of Douglas fir and aspen. Thus, water and water control

have been one of the persistant historical themes of the district.

There is little surface water in the district. Most of the eastern parts drain into the Rio Grande, the only permanent stream. The Rio Puerco, Rio Salado and numerous arroyos and dry washes carry off flood waters during the spring thaw with its melting snow and during the rainy season. The western part of the district is on the Pacific side of the continental divide, and the waters enter the Colorado River system through the Gila River. While the western parts of the district tend to have more surface water due to the higher elevations and better rainfall patterns, there is still a great lack of surface water. The San Francisco River, a principal tributary of the Gila River, is the main permanent stream in this area.

The Plains of San Agustin, an unbroken expanse of grassland rimmed by gentle mountains, are usually brown and perhaps uninteresting the the casual visitor. But the size is enormous--a straight line more than sixty miles long can be drawn across them in a northeast-southwest direction and the average width is about twenty miles. It is high country--about 7,000 feet. Mountains surround the plains almost completely with peaks reaching 9,000 feet or more. The village of Datil is on the western edge of the plains and Magdalena is about eleven miles to the east. U. S. 60 traverses the plains in a straight line twenty-three miles. The plains are a "no man's land" as far as

surface drainage is concerned. There are more than thirty washes from the mountains nearby but none flow except for short intervals during summer thunderstorms or following an unusually heavy snowfall in the winter months.

The playa, in the southwestern area of the plains, is part of the floor of an ancient lake that had an area of approximately 250 square miles and a depth of 165 feet at its highest stage. More than 200 gravel beaches, bars, spits, and wavecut benches have been identified, many of which can be seen from the Bursum Road that skirts the southwest edges of the plains.

The arid lands of the Socorro District are mostly public domain lands, either federal or state owned. Federal lands include those administered by the Bureau of Land Management and those administered by the Forest Service. The National Resource Lands (BLM) are distributed in five planning units. In the west, bordering Arizona, is the Quemado Unit. The Driveway Unit, encompassing mostly the area of the San Agustin Plains, is in the south-central part of the district. In the northern part of the district, sandwiched in between the Acoma and the Ramah Indian Reservations, lies the Cebolleta Unit. Also in the northern part of the district is the Ladron Unit encompassing the Ladron Mountains and that area to the north of the Ladrones. In the eastern part of the district is the Stallion Unit, encompassing the National Resource Lands in the Rio Grande Valley

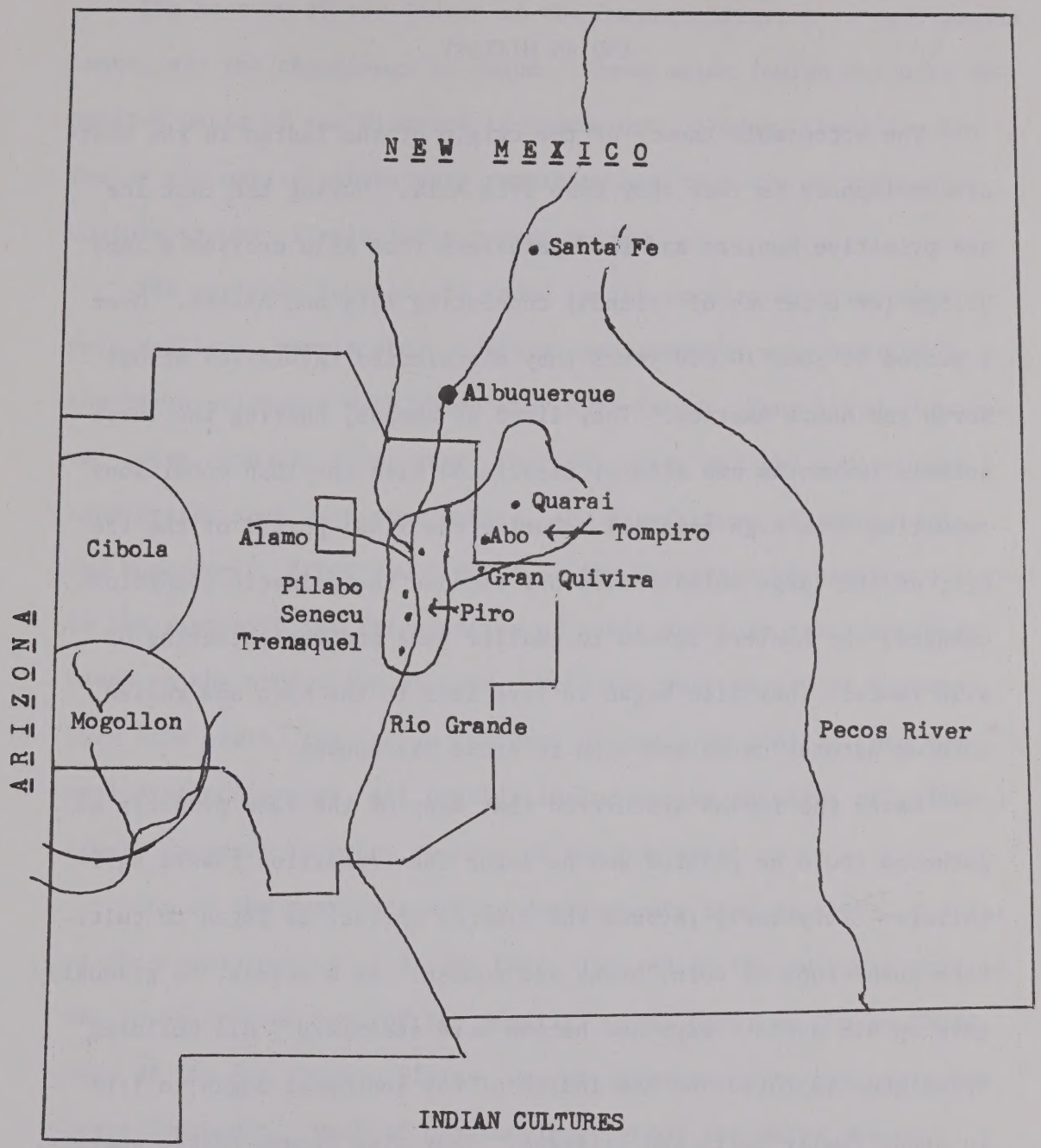
and extending east to the hills and mesas bordering the valley. National Resource Lands make up approximately one third of the total land in the district.

National forest lands are found in two areas. The Gila National Forest lands in the far southwestern part of the district, and three units of the Cibola National Forest in the central part of the district. The forest lands protect the higher mountain watersheds. They also make up about a third of the land area of the district.

The remaining third of the land area is about equally divided between state owned lands and privately owned lands. These lands are scattered throughout the district, but are concentrated along the northern half of the district.

The history of the Socorro District is a mosaic of many hues and shades, some harsh and stark like its dry desert mountains, some inviting like the shade of coolness of its timbered canyons and mountain springs. First are the many diverse and sometimes hostile Indian cultures. There were prehistoric hunters and food gatherers and later prehistoric village dwellers struggling to create agricultural societies along the banks of now dry rivers in the western part of the district, seeking a bare subsistence from these arid lands. There were peaceful Pueblo peoples tilling their lands and using the Rio Grande's water to produce abundance. And there were

the fearsome Apache who founded their homes in the broken mountain vastness and added their own excitement and tragedy to the mosaic. So, too, would the Spaniard make his mark and the Mexican who followed close behind. The place names in many parts of the district are Spanish names, although the Spaniard found the area a difficult place in which to maintain himself. Perhaps not so romantic, and not so colorful, but dominating and adding realism to the mosaic, was the Anglo-American who converted this land to the flag of the United States. Finally two major economic factors left a profound imprint on the region: stockraising and mining. The developing livestock industry was originated with the Spanish, continued by the Mexicans, and commercialized by the Americans. Everywhere--on the land and in the people--one can see signs of this heritage. Mining also palyed a dominant role, although of shorter duration. The exploitation of mineral resources came swiftly and dramatically in the 1880's and would dominate the economy of the district until the 1920's, when it declined to a trickle. Yet its imprint is clear. One can hardly lift his eyes to the hills without seeing signs of the prospector's shovel or the miner's work. One can hardly talk with the people of the area without discussing mines of the past or mines of the future. Livestock and mining are woven through the historical pattern and are never far from any part of the story.



INDIAN CULTURES

INDIAN HISTORY

The acceptable theory of the origin of the Indian in the Western Hemisphere is that they came from Asia. During the last ice age primitive hunters and food gatherers from Asia crossed a land bridge (or a series of islands) connecting Asia and Alaska. Over a period of some 10,000 years they distributed themselves across North and South America. They lived as nomads, hunting the large animals (mammoths and others) associated with the lush conditions resulting from high rainfall. During the final phases of the ice age, as the large animals dies off because the climatic conditions changed, the hunters turned to smaller game and the gathering of wild foods. They also began to live less in the open and relied more on natural caves and even to crude pit houses.

Later the Indian discovered that many of the food products he gathered could be planted and he began the transition toward agriculture. Very early (around the time of Christ) he began to cultivate such crops as corn, beans and squash. As a result, he gradually gave up his nomadic ways and became more sedentary. His building techniques improved and the Indian of the Southwest began to live in stone family units and villages. They also became basket weavers, painters and pottery makers. Crude tools of wood and stone were in common use and some crude irrigation techniques were developed.

The history of the Indian in the Socorro District is only partly known, and the chronology is vague. Three major Indian cultures inhabited parts of the District in times past. Today, there are but few of the native inhabitants remaining and they are of tribes or culture groups of relatively recent origin.

The earliest inhabitants found in the Socorro District were cave dwellers, people whose cultural achievements were limited by the harsh existence with which they were faced. They lived in natural caves, usually along water courses. They managed rudimentary handicrafts such as basket making, the manufacture of stone tools and bone work. After about 400 A.D. the Neolithic revolution occurred in the area with the introduction of crude agricultural techniques based on the production of corn. With the possibility of a sedentary life style, the Indian cultures of the area evolved into several distinct groups, all heavily influenced by patterns of cultural growth apparent in other regions of the Southwest.

One of the most interesting developments showing traits typical of this early period is at Bat Cave, located in the Driveway Unit in the south-central part of the district. Bat Cave, on the southern edge of the San Agustin Plains, was an important site for early man in the Southwest. Much of our knowledge about the early use of corn came from the data gathered at Bat Cave. The discovery of the remarkable site of human habitation was made by Herbert Dick

during archeological expeditions sponsored by the Peabody Museum in 1948 and 1950. Digging through six feet of miscellaneous debris, Dick found cobs and other parts of maize at all levels and at the bottom were tiny cobs two to three centimeters long. Radiocarbon dating showed these to date from 2000 B.C. The latest period of habitation was placed at about 1000 A.D. Three thousand years of primative man's occupancy can be traced at Bat Cave. Other archeological efforts show that nearly every cave or cave-like depressions have had human occupancy at early dates. They can be seen in the hills bordering the Rio Grande Valley where rock outcrops have been undercut by water and wind action, or where rock slides have created caverns. Most of these early peoples did not develop true agricultural societies, although they may have cultivated some crops. They remained more Paleolithic (old Stone Age) rather than Neolithic (new Stone Age, agricultural).

The oldest Neolithic cultures were in the western section of the district and were a part of the Mogollon-Cibola groups which dominated western New Mexico during the period 600 A.D. to about 1100 A.D. These people flourished in the upper Gila River drainage basin, later around Quemado (Quemado Planning Unit) and as far east as the Gallinas Mountains (northwest of Magdalena). After 1100 A.D. they gradually dispersed and eventually disappeared as a cultural group. Several factors influenced their demise: a serious drought in the 12th

century and the appearance of the Athabascan people (Apache) in the Southwest.

In the eastern part of the Socorro District, primarily in the Rio Grande valley and in the mountains that rim the eastern bank of the river, another important Indian culture developed. With the collapse of the older Indian cultures in northern and western New Mexico (mimbres, Mogollon, Cibola, Mesa Verde, Chaco, and others), there developed, after 1200 A.D., a pueblo complex in the Rio Grande Valley. Generally, the pueblos which grew along the Rio Grande watershed gathered into them the remnants of some of the earlier cultures who were leaving their traditional homes. There were, therefore, and eclectic accumulation of the earlier cultures. The part of this complex that developed in the Socorro District were called the Piro Indians. They inhabited such places as Abo, Quarai, Gran Quivira, Pilabo, Senecu and numerous other places along the eastern part of the valley between modern Highway 60 and Highway 380. The Spaniards founded some of their most important missionary churches among the Piros Of all of the New Mexico Indians, the Piros were the most loyal to the Spanish administration and the Catholic Church. The Pueblo peoples of the upper Rio Grande turned against the Spanish oppressor in 1680,but the Piros remained loyal. When the Spanish were forced to retreat from New Mexico most of the Piros, fearing retaliation by the other Pueblo Indians, went south to El Paso with

the Spanish. There they founded new villages and there they remained. Those Piros who stayed in New Mexico were dispersed or destroyed by the Apache and Comanche who constantly raided their villages.

Both the Piros and the peoples of the western part of the district were peaceful farmers wanting nothing more than to work their lands and to practice their handicrafts and their religion. Not so with the Athabascans, or Apache as we now call them, who had migrated from the northern plains seeking new homes. Along the high plains of eastern New Mexico the migration split into two groups, one continuing south down the plains into southwestern Texas and southeastern New Mexico. The second turned west and left the plains behind them, entering the arid and mountainous regions of central and western New Mexico, thence into Arizona. Along its route it left remnants of the migration who appropriated local areas for their own use. Left behind was their plains culture. The Indian was forced to adapt to the harsh conditions of mountain and desert. With his food supply sharply curtailed, he turned to the easiest source available--corn and other foods raised and stored by the various Indian farmers with whom he came into contact. Since he had already perfected his warlike talents, he found the Pueblo peoples an easy mark and pressed his advantage relentlessly. By the time the Spanish arrived in New Mexico in 1540, the Apache was master of the borderlands. In the Socorro District the western farmers had disappeared but the Piros still

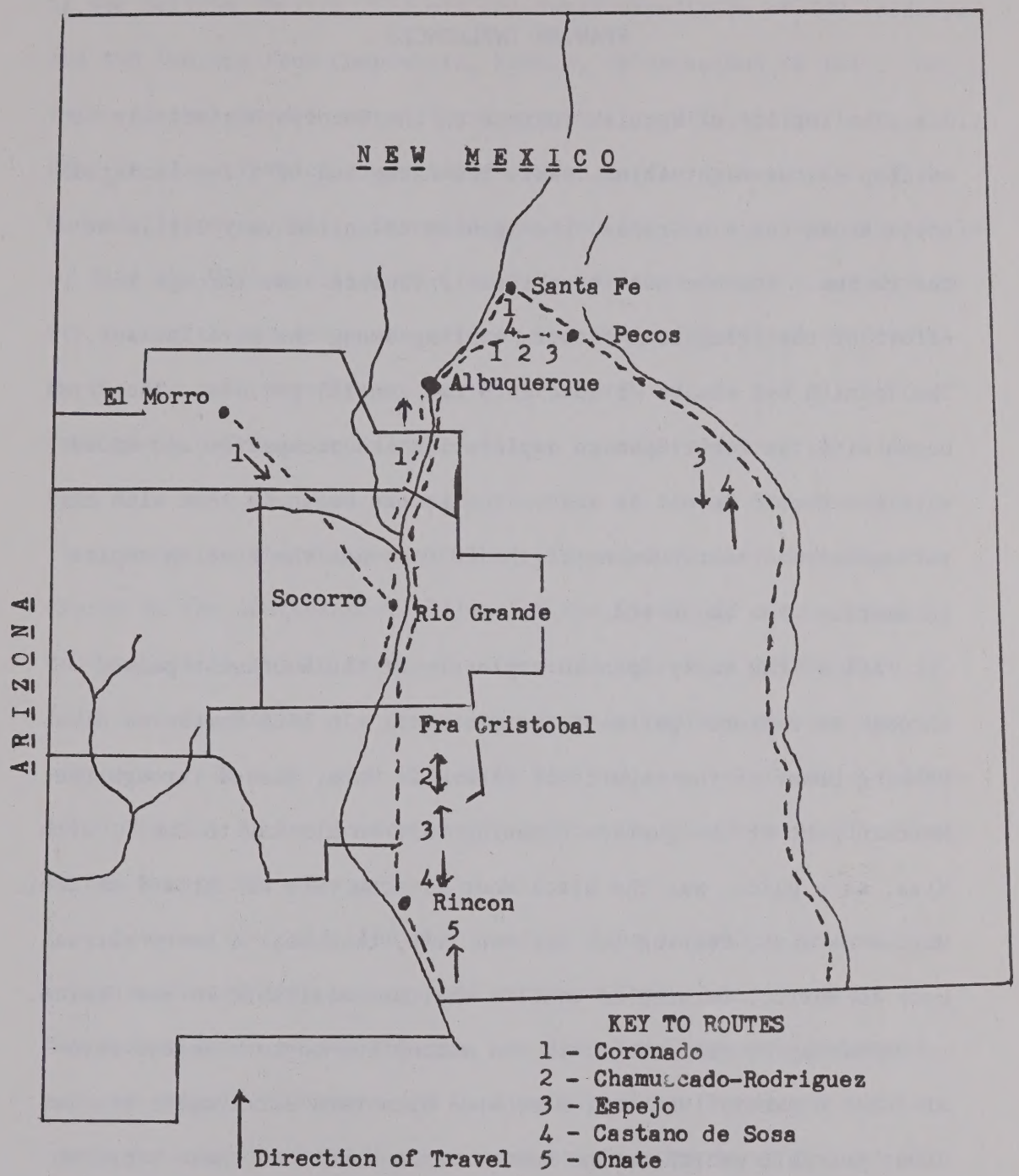
occupied their homes in the Rio Grande Valley. The Apache controlled everything west of the river into Arizona. They used the Magdalenas, the San Mateos, the Ladrones and other mountains as their strongholds. From these vantage points they raided and pillaged--first Indian, then Spanish, Mexican, and American communities.

Only one Indian group still lives in the Socorro District. Across the Gallinas Mountains from North Lake (San Agustin Plains) is the Indian settlement of Alamo. Legend tells us that this group originated from the Navajos when some of them dropped out of the trek to Fort Sumner in 1864 after Kit Carson invaded the Navajo homeland and was moving them to the Basque Redondo Reservation. The Apache contribution to the makeup of the band is believed to be relatively recent although the Apache clan is one of the largest in the band.

These people number about 900 persons and are spread out over an area of about 52,000 acres. They are represented on the Navajo Tribal Council at Window Rock, Arizona, but they remain an isolated group. The lands provide only marginal grazing and the mineral wealth is negligible. Isolation, education, medical aid and economic guidance present challenging problems for their leaders.

Today, signs of Indian culture abound everywhere in the district. Along dry arroyos, on buttes overlooking the Rio Grande and in mountain valleys, one need only to search to be amply rewarded by finding

Indian ruins and artifacts. While the Indian is lost to antiquity, except for the newcomers at Alamo, their contribution to the history of the district lives on in the ruins they left.



SPANISH EXPLORATION ROUTES

SPANISH INFLUENCES

The imprint of Spanish culture on the Socorro District is not as deep as one might think. With the exception of a few isolated spots along the Rio Grande, the Spanish colonized very little of the region. For the most part their influence came through the effort of the Franciscan fathers working among the Piro Indians. The Spanish era can be divided into two general periods. The first began with the first Spanish exploration and occupation and ended with the Pueblo Revolt in 1680. The second began in 1692 with the reconquest and continued until the 1820's when the Spanish empire in America came to an end.

All of the early Spanish explorers of the Southwest passed through or explored parts of the district. In 1539 Marcos de Niza, seeking proof of the reports of Cabeza de Vaca, passed through the western part of the Quemado Planning Unit on his way to Zuni. With Niza, as a guide, was the black Moor Estaban, who was killed at Zuni. Marcos de Niza, fearing for his own life, then beat a hasty retreat back to Mexico, failing to confirm what was available in New Mexico.

Fearing to tell the truth and attempting to turn defeat into at least a partial victory, Marcos de Niza told extravagant stories about possible wealth to the north. As a result of these stories, a young aristocrat, Franciso Vasques de Coronado, then governor

of New Galicia, Mexico, led his ill-fated expedition of 300 soldiers and 800 Indians from Compostela, Mexico, to Hawauikuh in 1540. He followed the general route of Friar Marcos de Niza,and it is possible that he also traveled a northerly course up the western edge of the Quemado Planning Unit. Coronado traveled far and wide but also failed to find the "Seven Cities of Cibola." Coronado sent out expeditionary forces to sound out the natives for news of gold and of Cibola. During one such expedition, Don Francisco de Ovando led his forces down the Rio Grande and reached Pilabo on about January 12, 1541. From this date the Piro village, that was to become Socorro, was first known to the white man. They proceeded further down the Rio Grande to the southernmost village of the Piros and then returned to Tutahaco to rejoin Coronado. Coronado retreated into Mexico in 1542, leaving behind the Franciscan Juan de Padilla and two lay brothers. All were later killed by the Indians. Coronado's failure to find great riches in New Mexico led to the abandonment of efforts in New Mexico for 40 years.

Between 1540 and 1580 the frontier line in Mexico gradually crept northward into Durango and southern Chihuahua. Interest in New Mexico again became intense. In 1581 Fray Augustin Rodriguez and two other Franciscans and Capitan Francisco Chamuscado with a small detachment of soldiers crossed the Rio Grande at present El Paso and followed the east bank, crossing the Jornado Del Muerto

(Journey of Death) east of the Fra Cristobal Mountains. (From this point until they reached the vicinity north of present La Joya they were in the Socorro District.) They continued up the east bank and possibly the first Indian village they reached containing the large communal house was located where San Marcial is now situated and was the same Piro village visited by Coronado's captain in 1542. According to Bandelier the name of the village was Trenaquel. Leaving Trenaquel, the party continued up the Rio Grande visiting almost all the Pueblos along its banks and on its branches. The friars remained in New Mexico and the soldiers returned to Mexico.

In 1582 the expedition of Antonio de Espejo and Fray Bernaldino Beltran continued the work of Rodriguez and made an extensive exploration of New Mexico. Like Rodriguez, they entered New Mexico from the south following the Rio Grande. They visited the Piro villages in the Socorro District that were along the river. They continued into the Pueblo Indian areas of northern New Mexico, went out onto the plains, and west into Arizona. The reports and recommendations of the Espejo expedition led to the Royal Cedula ordering the conquest and colonization of New Mexico. Juan de Oñate was named to lead such an expedition and began his famous entrada in 1598.

The Oñate expedition consisted of ten Franciscans to Christianize the pagan Indians and 129 soldier-colonists, many with their families. The caravan included the necessary household effects

for the colonists, domestic livestock, and seeds and shrubs to be planted at their new homes. It started out, May 4, 1598, from Bartolome, Mexico, and crossed the Rio Grande at or near present El Paso, Texas. Like their predecessors, they traveled up the east bank of the Rio Grande across the Jornado Del Muerto between the river and the lava flow. It was about May 26th, when the expedition reached the southernmost Piro village of Trenaquel, which was on the opposite side of the river and south of Qualacu. At Trenaquel, Oñate was received in a hospitable manner with food and shelter being provided for all, so they remained until the middle of June. Then they pushed northward to the village of Teypama which was on the east bank of the Rio Grande near the mouth of the Rio Puerco (north of present Socorro). The Spanish called this village, "Nueva Sevilla." Having eaten or lost most of their supplies during the journey, the tired and hungry expedition made camp and when the Indians saw the sorry plight of the would-be colonists, they approached with maize and other food. Oñate was so pleased with this timely help that he named the place Socorro. Because of raids by hostile Indians, the Teypama Indians later fled to Pilabo, the village that is known as Socorro today.

The early place names in the district are attributed to Oñate and his colonists when they passed through in 1598. As they slowly progressed north up the valley they gave names to their camp sites and to outstanding landmarks. Among these appears the name

Socorro, later applied to the Piro Indian village of Pilabo on the site of modern Socorro, when the Indians gave aid to the colonists in the form of food. Thus the name of the District can be traced to the Oñate colonists.

The Socorro District did not immediately feel the impact of Spanish colonization. The attention of the Spaniards was on the more heavily populated and better-watered upper Rio Grande valley. The extension of the Franciscan mission movement in 1626, however, led to the founding of missions among the Piros.

The Franciscans introduced cattle and sheep raising,along with new tools and crafts to the Pueblo people including the Tompiros and Piros in the Socorro District. They taught the Indians new methods of utilizing sun-dried adobe bricks and stone and supervised the building of many imposing mission churches. Friar Alonzo de Benavides turned his attention to the Piros and Tompiros in the summer of 1626 when he visited them for about a month. Fray Martin de Arvide worked among them for a short period of time and may have started a friary as early as 1626, but the permanent foundations in the area were started in 1629 when Fray Antonio de Arteaga and Fray Garcia de San Francisco arrived. The mission Nuestra Senora del Socorro was located at the Pueblo of Pilabo near present Socorro. The village named Sevilla by Oñate was renamed Sevilleta. Visitas was established at the villages of Alamillo and Sevilleta. A mission

was founded at Senecu in 1629 near the present town of San Antonio which may have received its name from the patron saint of the mission, San Antonio de Padua. Missions were also built at Quarai, Abo and Grand Quivira. These missions are on the fringe or outside the Socorro District.

The missions were never important Spanish centers. Certainly there were Spanish padres in residence, but there was little or no other Spanish population. All of the missions would disappear after the pueblo revolt in 1680. The remains of these abandoned centers are still visible among the ruins of the mission churches.

One of the most important and oldest road in North America was laid out between Santa Fe and Chihuahua City by the Spaniards: it was called the Camino Real (a name given to many "Royal Roads" in the Spanish empire). This famous road struck north from Chihuahua City directly to El Paso del Norte (modern Juarez), crossed to the east bank of the Rio Grande, following the river to the area of Rincon. There it left the river and entered the famed waterless passage of some 90 miles called, for obvious reasons, the Jornada del Muerto, (Journey of Death). It returned to the river at Fra Cristobal, again following the course of the river until it reached the vicinity of Santa Fe. From Fra Cristobal to La Joya it passed through what is now the Socorro District, and there were a number of important points along this road where travelers or caravans stopped for water

and rest. Many of these places still exist, occupied in some cases, in others only names from the past: Fra Cristobal, Valverde, Luis Lopez, La Joya de Sevilleta, Filipe Romero. Socorro was on the west side of the river and never a stop on the Camino Real.

The Pueblo Revolt of 1680 ended, temporarily, any Spanish influence in the Socorro District. The failure of the Spanish to hold out against the combined efforts of the Pueblo people, the abandonment of the region and the fact that the Piro Indians in the area decided to leave their homes, left the district largely in the hands of Apaches.

The Apaches had stolen many Spanish horses and by the 1640's had become expert horsemen. They never learned to breed horses for replacements,and additions had to be acquired by stealing. However, it is interesting to note that they learned the technique of soaking the hooves in boiled woodchuck fat for a few hours to toughen them. They refused to accept any type of Spanish rule and with their newly acquired mobility successfully raided outlying Spanish settlements. Governor Fernando de Villanueva (1665-68) faced an Apache-Piro conspiracy. His men ran into an ambush in the Magdalena Mountains and suffered the loss of five men, but the Governor proceeded to hang six Piros and imprisoned others or sold them as slaves.

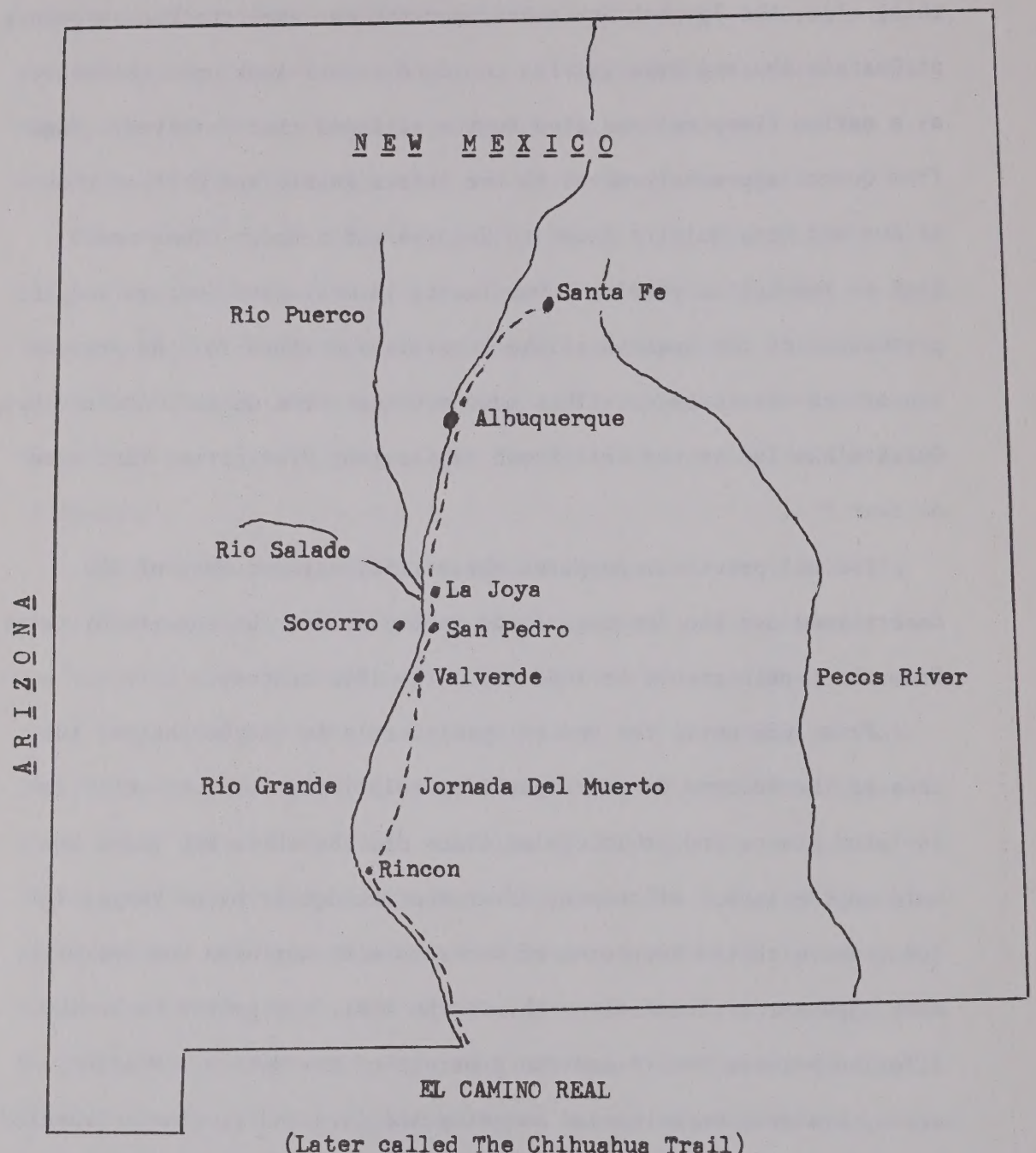
Before long, the hostile Indians boasted enough Spanish horses for rapid predatory incursions into San Pasqual, Senecu, Socorro, Quarai, Abo, Gran Quivira and the Saline District. More than any-

LIBRARY COPY

thing else, the Spanish horse hastened the day when the Pueblo people at Quarai, Abo and Gran Quivira could no longer look upon themselves as a nation (Tompiro) and fled to the villages that survived. Those from Quarai apparently moved to the Isleta Pueblo and most of those at Abo and Gran Quivira moved to Socorro and Senecu. Some moved east to the Saline pueblos. One factor in moving to Socorro was the protection of the Spanish soldiers garrisoned there for the protection of the missionaries. This mass movement from Quarai, Abo and Gran Quivira has led to the well known expression, "The cities that died of fear."

For all practical purposes these wild, untamed sons of the desert remained the dominant force in and around the Socorro District from the pueblo revolt in 1680 until the 19th century.

From 1680 until the end of Spanish rule in the Southwest, the area of the Socorro District remained relatively dormant. Only in isolated places and at irregular times did the white man leave his mark on the land. Of course, after the reconquest by de Vargas in 1692, and with the reopening of contacts with Northern Mexico, many, many, Spaniards passed along the Camino Real. It proved to be the lifeline between Mexico and the province of New Mexico. Missionaries, traders, incoming and outgoing settlers and governors traveled it for company and security. It carried mail (dispatches) for both the officials, missionaries and colonists. Governors used the wagons



EL CAMINO REAL

(Later called The Chihuahua Trail)

Indicated by: - - -

on the return trip for exporting hides, woven cloth, salt and Indian captives. The Camino Real, a deeply rutted roadway later called the Chihuahua Trail, belongs among the greatest pioneer roads of American History.

The plow was brought in, along with Castilian wheat, grapes, plum, peach, watermelon, cantaloupe and chili. The settlers contributed buffalo hides, antelope and deer skins and dried meat that was exchanged with the Pueblo people for cotton cloth and corn or traded for knives and/or other items brought in by the Franciscan caravans. The practice of taking Indian slaves became well imbedded in New Mexico and was not discontinued until after the American Civil War.

Again there was sporadic activity at Fra Cristobal, a ranch developed at Luis Lopez, at La Joya, and at a few isolated spots along the trail. In isolated instances hardy Spanish colonists tried to wrest a living in the Rio Grande valley, despite the danger from hostile Indians. But each of these was no more than an oasis, and was concerned with the trade along the Camino Real, not in developing the area that is the Socorro District. Their influence was confined to the narrow margins of the Rio Grande.

Only on rare occasions did the Spanish penetrate the regions in the western parts of the Socorro District. That country belonged to the Apache. In the late 18th century the Apache in this region

adapted to the horse, and while he was dangerous as a warrior on foot, mounted the Apache maintained almost complete control. As a result of increasing Apache raids, the Spanish made several attempts to meet and conquer him in his own country.

Governor Ceballos led an expedition into their Mogollon area in December, 1747, returning by way of the San Francisco River Valley. Lope de Cuellar led an expedition against them in August, 1767, where he was badly defeated on the San Agustin Plains. In 1774-75 Hugo O'Coner, with a force of 400 soldiers, penetrated the San Agustin Plains in pursuit of the Apache and then continued south through the Mogollon Mountains and back into Mexico. In November, 1780, Governor Juan Bautista de Anza moved a force of 151 Spaniards and Indians down the Rio Grande against the Apaches. The Alcalde Mayor of Laguna led an expedition into Apache country in October, 1784, and penetrated as far as the San Francisco River. In June, 1785, forty-six Navajos, including several principal leaders, went to Laguna for help against the Apaches. About 150 fighters under Don Jose Maldonado led the two-weeks campaign and engaged the Apaches on two occasions. Don Jose Antonio led a force of 340 men against them in October, 1787, and fought them in the area of the San Francisco River. The Mescalero Apaches were busy raiding during the winter of 1787, while the Gila Apaches were raiding throughout the

Socorro District, including two attacks on Senecu (present San Antonio). Governor Don Fernando de la Concha led an expedition southwestward through the San Agustin Plains, west to the area of present Pie Town then to the east fork of the Gila River where he engaged the Apaches, killing eighteen and taking four prisoners. He then crossed eastward to the Rio Grande and turned north to Santa Fe. But the solid front resistance to the Spanish of the warlike Indians (Apache, Navajo, Ute and Comanche) was slowly weakening as the eighteenth century came to a close.

While it is true that there was little or no development in most areas of the Socorro District in the 18th century, this same generalization will not apply during the Spanish portion of the 19th century. It was between 1800 and 1821 that the heaviest Spanish influence was felt.

In January 1800, Governor Chacon was instructed to resettle the old site of Socorro as had been planned for a quarter of a century. However, the ruins of Socorro were on the west side of the Rio Grande whereas the Camino Real was on the east side. Sevilleta was nearer the known haunts of the Apaches and, also, the irrigation ditches had been ruined by flood waters and it was too late to repair them and plant a crop. So Alamillo was selected as a beginning. Sixty-two families were located there by March. It became known as Sevilleta.

When Zebulon Pike passed by it in 1807 he described Nuestra Senora de los Dolores de Sevilleta. Carlos Gabaldon, on behalf of all, requested the establishment of boundaries in 1819. On May 29, 1819, Governor Facunda Melgares approved the request and the limits were fixed at the hill of Sabinal on the north (which overlaps the Belen Grant in places) and where the Arroyo de Alamillo drains from the east and the Arroyo San Lorenzo drains from the west as the southern boundary. This was a community grant to sixty-seven families and is known as the La Joya de Sevilleta Land Grant.

Governor Don Alberto Maynez (1814-1816) was aware of the problems of landless people and of the frequent disputes over land boundaries. So he advised the Alcalde Mayor of Belen to reoccupy the lands at Socorro and this was done in the spring of 1815. When the original title papers were lost Governor Manuel Armijo approved the issuance of new ones. The boundaries were established as six leagues east, west, north and south from the ruins of the old mission church.

In this same region, Antonio Chavez, a resident of Belen, received a land grant popularly known as the Alamillo or San Lorenzo tract, which was bounded on the north by Alamillo table land and on the south by a small forked cedar in the middle of Pablo Garcia's ranch, all on the west side of the Rio Grande. But in later years the river played one of its many tricks and washed away the Garcia house.

The valley of Valverde, which begins some twelve miles south of San Antonio, was granted to Don Pedro Arcus de Amendaris in December, 1819. Don Pedro collected tithes in New Mexico--which was done on a contract basis--and he had been a lieutenant in the garrison troops at San Elezario and needed land for livestock being brought up from Mexico. He found it necessary to keep armed men on the grant to protect his cattle and to furnish free water and pasture to the travelers. He erected fences to protect his cultivated land from the livestock. But the grant was too exposed and in 1824 Don Pedro abandoned it under pressure from the hostile Indians. But the grant was valid and continues as private land to this day.

THE MEXICAN PERIOD

During the period when New Mexico was a part of the Mexican Nation (1821-1846), the history of the Socorro District was a period of stagnation. Mexico, struggling to establish herself as a nation and plagued with crisis after crisis, was in no position to care for a far-flung, poor and troubled frontier. Hence, the people of the Socorro District suffered a period of acute poverty. Trade along the Camino Real dwindled and the entire province declined. Only at the emerging agricultural villages in the Rio Grande Valley was there human activity. However, one bright spot did appear on the horizon. Beginning in 1821 a long thin line of wagons threaded their way across the treacherous plains, over the high mountain passes, finally reaching Santa Fe after many weary miles out from the Missouri communities. The Santa Fe trail played a major role in keeping New Mexico communities alive until the whole area became subject to United States' control. Some of the merchandise moving from Missouri to Santa Fe was destined to be transhipped over the Camino Real to Mexico, and the Socorro area would benefit from this. Thus, the most far reaching change during the period was the abandonment of the Spanish policy of exclusion.

This policy, which was in effect during the entire Spanish colonial period in the western hemisphere, was that all goods, mater-

ial and merchandise imported into and exported from the Spanish colonies had to flow through Spain and be transported on Spanish ships. This policy was hard to enforce and some illegal trade had been going on, especially in Mexico and Central and South America. But some of it had reached into the Province of New Mexico between an increasing number of fur trappers and traders and the local merchants, with the local officials taking a "cut" for not reporting it. Now, however, the trail from Santa Fe to St. Louis, Missouri, was opened and merchants and settlers began arriving in increasing numbers. This new trade was so much better for the New Mexicans than their former trade with the Chihuahua merchants that the Chihuahua trade was practically abandoned for a while. But the American traders, upon learning of the tremendous quantities of silver being mined in Mexico found it highly profitable to continue south to Chihuahua with their merchandise and return, some by different routes, with their harvest of silver. This increased traffic on the Camino Real caused the name to be changed to the Chihuahua Trail. It had considerable impact on the Socorro District and the population, especially along the Rio Grande, increased.

In 1822, for example, 70 men with pack animals and three wagons reached Santa Fe from Missouri with about $15,000 in American made goods and about $9,000 of this was transported to Chihuahua. However, in 1846, 750 men with 363 wagons with about one million dollars

in goods reached Santa Fe from Missouri and 315 wagons passed through the Socorro District on their way to Chihuahua and other towns in Central Mexico.

The trip to Chihuahua by laden wagon trains required 40 days, whereas, only 20 days were required by mule pack trains. So, during the latter days of the trail, which lasted until the railroads were built in the 1880's, mule pack trains were widely used.

Important stopping places through or on the fringe of the Socorro District were at Hacienda de Casa Colorado, Pueblo de la Joya de Sevilleta, Rancho de la Parida, Hacienda de Luis Lopez (which was on both sides of the Rio Grande), Valverde and Fra Cristobal. It is to be noted that there was no habitation beyond Luis Lopez for the next 135 miles and no camp on the Rio Grande beyond Valverde for the next 90 miles.

The fur trappers and traders (known as the Mountain Men) hunted and trapped the few streams of the Socorro District, however, the number and value of the pelts taken was of no great significance to the economy of the district. But it was here that we find the famous American scout and Indian fighter, Kit Carson, in August, 1829, in a grudge fight with the Apaches for having attacked an earlier expedition.

While there were stirrings of activity along the Rio Grande, few other parts of the district were affected during the Mexican period. The eastern parts of the district were still controlled

by the hostile Apache and Comanche. The western parts were in the hands of the Apache and no settlement was possible.

THE AMERICAN PERIOD

The spectacular growth of Socorro County, and all of New Mexico for that matter, began with the occupation of the Southwest by the Anglo-American. The Mexican War, 1846-1848, wrested about half of the national territory away from Mexico and made it a part of the public domain of the United States.

Brigadier General Stephen Kearny was at the head of the American troops that peacefully occupied Santa Fe on August 18, 1846. After appointing Charles Bent as Governor of New Mexico and leaving Colonel Sterling Price in military charge, Kearny led his main army down the Rio Grande (Chihuahua Trail) through the Socorro District and then turned west toward California. In October, and as part of the troops of Colonel Philip St. George, a volunteer battalion that later became famous as the "Mormon Battalion" followed Kearny down the Rio Grande and through the Socorro District before turning west toward California. Their route has become known as the "Mormon Trail."

With the signing of the Treaty of Guadalupe-Hidalgo ending the war in 1848, a flood of people crossed the plains. Some were headed for the gold fields in California, some came as traders to Santa Fe. There were ranchers, adventurers, health seekers, soldiers, and tourists. Many simply passed through, other stayed. They spread to all corners of the territory, and the Socorro District got her share. They searched for wealth in land, in cattle, and in minerals. Very

early it was determined that there were stores of precious minerals in many parts of New Mexico and the clamor for exploitation began. There was, however, one major block to this demand. The Apache menace still persisted, and until the vicious raids were contained, there could be no growth.

The result was a growing pressure on those in high places to bring in troops in sufficient numbers to stop the Apache. All across the Southwest military forts and encampments sprang up to accomodate the increasing number of troops. The Socorro District participated in this great effort to control the Apache.

Companies D and E of the 2nd Dragoons were stationed in Socorro from November, 1849 to August, 1851, and were augmented by Company H of the 1st Dragoons and Companies A and H of the 3rd Infantry in 1850. Company H of the 1st Dragoons was transferred to Socorro from San Isidro where it had been stationed from November, 1849 to June, 1850. By General Orders the 1st and 2nd Dragoons and the Independent Regiment of Mounted Riflemen were redesignated 1st, 2nd, and 3rd Cavalry respectively. Also, by War Department Directive 1883, "Companies" of Cavalry were redesignated "Troops".

Companies D, E and K of the 2nd Dragoons and Companies B and G of the 3rd Infantry built an Army post designated Fort Conrad on the west bank of the Rio Grande across the river from Valverde about 25 miles south of Socorro in February, 1851, and was augmented by

Company I of the 1st Dragoons for a short period in 1852. The companies of the 3rd Infantry were moved in 1853, with the companies of the 2nd Dragoons manning the Fort until March, 1854, when it was closed and Fort Craig was opened a few miles further south and on the west bank of the Rio Grande in April, 1854. During this and later periods, volunteers were stationed at Luis Lopez and Valverde. The primary purposes of these troops were to protect the wagon and pack trains on the Chihuahua Trail and the settlers against raid of the Apaches who frequently visited the Bosque del Apache because of the water supply and the cottonwood groves.

Fort Craig was established in April, 1854, and continuted until June, 1885. The units stationed there and the changes in total strength from time to time are not relevant to this brief history. Suffice it to say here that this post was one of the most important in New Mexico in service against the Apaches and during the American Civil War.

But trouble was brewing back east--the division of the north and south over slavery and other political questions. According to the Missouri Compromise, the Territory of New Mexico was eligible for admittance to the Union as a slave state, and possibly some of the immigrants were inclined favorably toward the Confederates. However, the major Confederate thrust into New Mexico, including the Socorro District, was to sever the Southwest from the Union and

thereby secure the gold fields of California and Colorado for the south.

Captain (later General) H. H. Sibley, a Texan and West Point graduate, was stationed in northern New Mexico when the Civil War began but decided to cast his lot with the Confederates. It is possible that the fact that Texas had always considered the Rio Grande as their natural western boundary influenced his decision to some extent. After a considerable delay Sibley had created a Confederate Army and moved into New Mexico and up the Rio Grande, meeting little resistance until he met and defeated the Union forces of Colonel (later General) E. R. S. Canby (consisting of both regulars and territorial volunteers) at the Battle of Valverde on February 21, 1862. By-passing Fort Craig, the post of Colonel Canby, Sibley crossed the Rio Grande and marched northward through the Socorro District accepting the surrenders of Union forces at Socorro and other points along the way. Sibley lost his supply train in the northern reaches of the territory and was forced to retreat southward. As he re-entered the Socorro District along the west bank of the Rio Grande, the Union forces marched virtually by his side on the east bank of the river. On the afternoon of April, 17th, the Confederates reached a point where the Rio Puerco drains into the Rio Grande and halted and made camp. The Union forces continued on to La Joya, a point just slightly to the south, and halted and went

into camp. Both camps were in full view of one another.

Sibley decided to avoid another encounter with the Union forces and that Fort Craig had to be by-passed. Accordingly, after the troops had finished supper, he ordered every man to wear what he could and to burn the rest. Thirty-eight wagons were abandoned and after dark the Confederates struck out south and west until they reached the Rio Salado, which they followed for some distance.

The next morning, Graydon's Spy Company crossed the Rio Grande and found that, with the exception of some sick and disabled soldiers, the Confederates had departed. Graydon observed that the Texans had taken an old trail through the mountains which passed 20 miles to the west of Fort Craig and came out on the Rio Grande 30 miles to the south. He reported to Canby that the Confederates had buried all their artillery except two pieces, had burned all but 15 wagons, and were going through the mountains to Mesilla by way of Cook's Springs.

That same morning, while still on the Rio Salado, the Confederates buried 3 howitzers and 78 shells, destroyed 6 one hundred pound barrels of powder and burned 19 wagons, 10 ambulances, 6 caissons and 3 carriages. They then set out southward over the mountains, valleys and plains down the west side of the Magdalena Mountains. Along this trail they blew up another caisson, burned 3 more wagons and destroyed some hospital supplies. They crossed the San Mateo

Mountains and on the morning of April 24, reached the Alamosa River. Early the next morning they reached Steele's camp who was bringing supplies to them. That afternoon they reached the Rio Grande.

The detour of over 100 miles had been costly to the Confederates but to Sibley it had achieved its purpose. There had been no clash with the Union forces, Fort Craig had been by-passed, and they were now safely below the enemy and could return to Fort Bliss in safety.

A century of search by curiosity seekers and souvenir hunters has failed to locate the route taken or the graves of the men who died on the long journey.

When General John H. Carlton arrived in the territory to take charge of the military forces, he ordered concerted action against the hostile Indians. He placed Militia Colonel (later General) Christopher "Kit" Carson in charge of the military forces against them. By 1863 Carson had largely subdued the Mescalero Apaches and placed them on the Bosque Redondo Reservation near Fort Sumner. He then began a two year campaign against the Navajos. All this had very little impact on the Socorro District except that some of the Navajos dropped out on the march to Fort Sumner in 1864 and founded the Alamo Indian Reservation which is still in existence to this day.

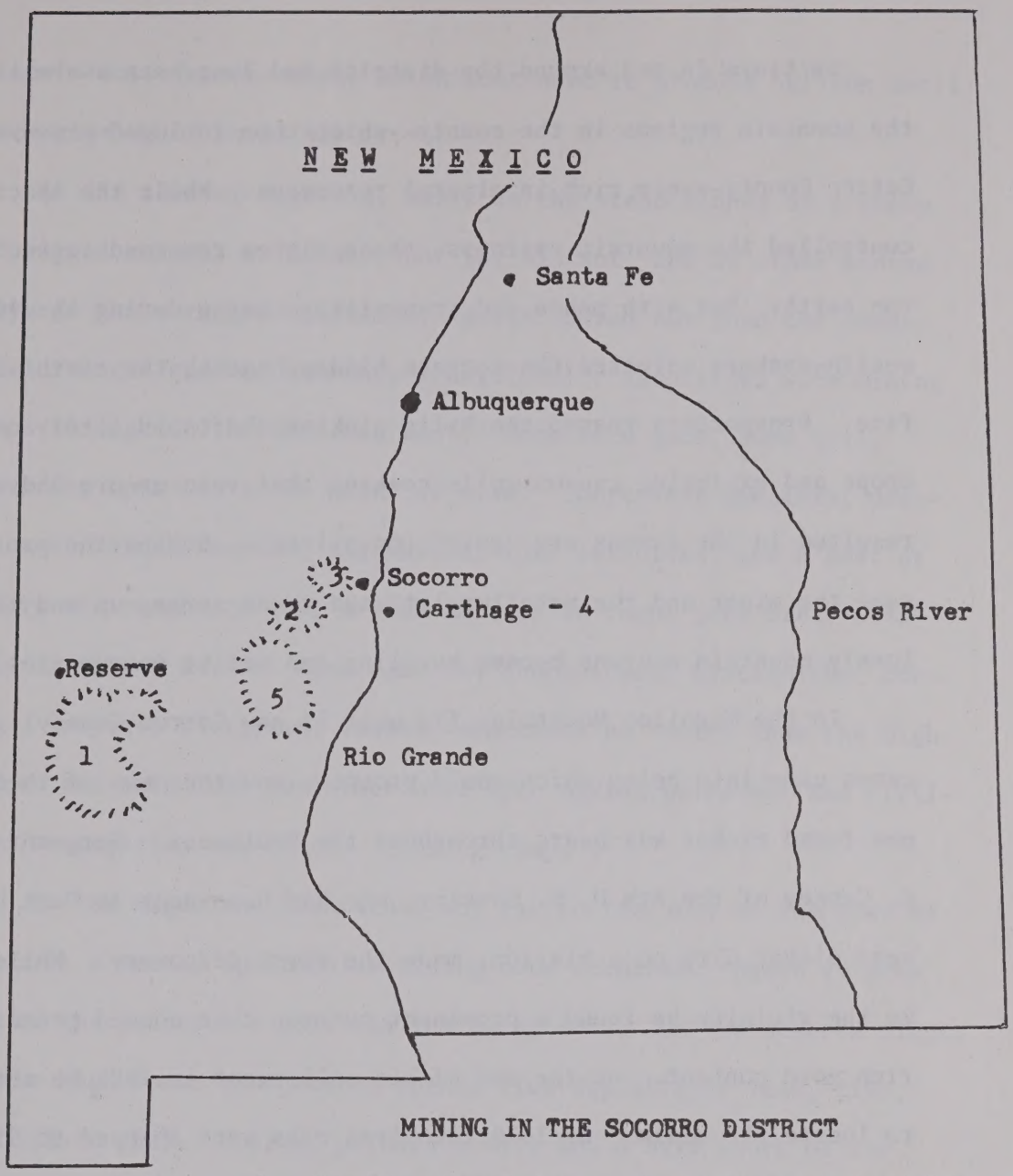
Difficulties continued with the Gila and Chiricahua Apaches as they particularly menaced the developing mining operations as

well as the settlers and prospectors. Eventually a ring of forts surrounded Apache lands and thousands of trained infantry and cavalrymen stood poised against the Apache. Against this new force the Apache had no chance. The American army was not armed with lances and smoothbore muskets as were the Spanish against whom the Apache were so successful. Now the Apache faced repeating rifles and pistols, and new military techniques. The end was inevitable. In this warfare the Socorro area played a substantial role. Many of the mountains in this region were old and well established Apache strongholds. The valley communities in the country were constantly subjected to devastating raids by the Apache, much more so than any other communities in New Mexico. Several key forts and Indian agencies were established in the Socorro District in an effort to control the situation.

A reservation was set up for them at Ojo Caliente. This was mostly a holding area as it was not enclosed and in no way could be considered a fort or military post. The soldiers stationed there were from Fort Craig and drew their supplies and replacements from that post. The Apaches were moved from Ojo Caliente to Fort Tularosa on the San Francisco River in present Catron County. This post was established in April 1872 by Company H of the 8th Cavalry and Companies B and K of the 15th Cavalry in conjunction with the Southern Apache Indian Agency. Again, the post was not enclosed and there

was no way the troops stationed there could force the Indians to remain, especially during the harsh winter months. So, after three years, Chief Cochise who had refused to go to Fort Tularosa, and the other Apaches were returned to Ojo Caliente in November, 1874, and Fort Tularosa was abandoned. Cochise refused to stay at Ojo Caliente and a permanent reservation was set up for them in eastern Arizona--which had been made a separate territory at the Treaty of Guadalupe-Hidalgo. In the meantime a post, called Datil/Horse Springs, had been established by Troop D of the 6th Cavalry and Company E of the 22nd Infantry in October, 1885, near the ground now occupied by the Dtil Springs Camp Grounds of the Bureau of Land Management. These troops were augmented by Company C of the 10th Infantry and Companies D, F and H of the 13th Infantry in 1886. The men or units were scattered from time to time to occupy high prominent outcrops or peaks to keep constant lookouts for Apache activities. The post was closed in September,1886. The Indian wars lasted from 1846, with the first American penetration into New Mexico, to the 1880's. The end came in 1886 when Geronimo and his few ragged followers surrendered to General Miles in Skeleton Canyon, Arizona. The final defeat of the Apache set the stage for sudden and rapid growth in the Socorro District.

With the elimination of the Apache menace, the Socorro District became the center of political and economic life in New Mexico. This sudden growth was directly connected with mining and stockraising.



MINING IN THE SOCORRO DISTRICT

1. Mogollon Mountains
2. Magdalena Mountains
3. Socorro Mountains
4. Carthage Coal Fields
5. San Mateo Mountains

Settlers in and around the district had long been aware that the mountain regions in the county--which then included present Catron County--were rich in mineral resources. While the Apache controlled the mountain vastness, these riches remained locked in the earth. But with peace and tranquility coming during the 1880's, wealth-seekers unlocked the secrets hidden beneath the earth's surface. Prospectors roamed the hills sinking shafts in likely outcrops and exploring canyon walls seeking that vein or ore body which resulted in the famous cry "gold" (or silver). Behind the prospector came the miner and the metallurgist, and towns sprang up and the lonely mountain canyons became bustling and active communities.

In the Mogollon Mountains (in what is now Catron County) gold camps came into being which would prosper, and the news of their new found riches was heard throughout the Southwest. Sergeant James C. Cooney of the 8th U. S. Cavalry, who had been sent to Fort Bayard near Silver City on a mission, made the first discovery. While in the vicinity he found a prominent outcrop that showed promise of rich gold content. At the end of his enlistment in 1876 he returned to locate the claim. By 1879 the first ores were shipped to Silver City for processing, but attacks by hostile Indians in 1879 and 1880 temporarily closed the area. Apaches led by their famed Chief Victorio raided the region in 1880 and Cooney was killed. Cooney's important discovery led to the development of Mogollon, one of New

Mexico's most famous camps, which continued to produce bullion until the beginning of World War II.

At the town of Mogollon, built on the steep slopes of a sharp and rugged canyon, at Cooney, not far distant, and at other mining camps in these rugged mountains, wealth poured out into the county and lured the kind of elements traditionally associated with mining camps throughout the American west. Some were good, some evil, depending upon one's own point of view. There were gamblers, prostitutes, saloon keepers, highwaymen, land swindlers, and a host of others who sought to reap a rich harvest in camps gone crazy with gold or silver fever. Also came the shopkeepers, blacksmiths, doctors, lawyers, clergymen, lawmen--sometimes no better than the highwaymen and swindlers but often bent upon making permanent and civilized communities out of the "roaring camps".

In the Magdalena Mountains, not far to the west of the town of Socorro, a second spectacular mining boom occurred. Again it grew out of the peaceful conditions following 1880. On the western slopes of the Magdalenas prospectors opened rich deposits of lead, zinc, and silver ores. Nearby, perhaps a mile and a half south of the town of Magdalena, the town of Kelly grew and prospered.

In 1864, Peter Kinsinger found some rich mine float at Pueblo Springs near Magdalena. Some of the ore he showed to J. S. Hutchison who waited twenty years before he would make use of Kinsinger's

map and he failed at that. Working on his own, southwest of Magdalena, he located the Juanita Claim and a few weeks later the Graphic. A friend of his, Andrew Kelly (after whom the town of Kelly was named) set up a mining camp that proved to be quite successful. But both men sold out their holdings.

While the discovery of mineral deposits at Kelly date back to the 1860's, active large scale mining began in 1881. In that year Kelly mine, which was to become one of the most famous in the mining district, was acquired by Gustav Billing, who developed the lead deposit to its fullest potential. The mine remained in the family until 1904 when Mrs. Billing sold it to the Tri-Bullion Mining and Smelting Company.

The Juanita, near Kelly, was owned by E. W. Eaton in 1882. Eaton was involved in ranching in Socorro County and founded the Socorro Vigilance Committee in 1881. In 1882 he reported about the Juanita:

> "One million pounds of this bullion (lead) is on ground, it assayed five ounces of silver to the ton of ore in addition to the lead. Pinon charcoal was used in smelting. As soon as the connection with the AT&SF is complete, cheap coke at Socorro will become an important factor in the metallurgical process."

Gustav Billing built a smelter at Socorro to handle the lead carbonate ores from Kelly as well as custom smelting from other mining areas in New Mexico. During the first years of operation, ores had to be hauled from Kelly to Socorro in huge ore wagons pulled by oxen. Transporting ore down Blue Canyon was difficult, treacherous and time consuming. In 1883, the Santa Fe railroad agreed to build a spur to Magdalena and Kelly if the mines at Kelly would guarantee a certain tonnage per year. Such a guarantee was easy to meet and the railroad was completed that same year. During the peak year of 1884, the Billing works produced bullion valued in excess of one million dollars.

With the railroad to the mines and the smelter in Socorro, the expansion around Magdalena and Socorro was staggering. Magdalena grew to almost 1,300 and Kelly fluctuated between 500 and 800. Socorro grew rapidly to a town of almost 5,000 by the middle eighties.

The Kelly and Graphic mines were the major producers, accounting for about ninety percent of the estimated total of $9,000,000 yield, most of which was produced before 1890. The Juanita was of secondary importance, followed by a number of lesser mines and claims.

The Graphic Mining and Smelting Company built a smelter at Magdalena in connection with the Graphic mine. First mentioned in the Socorro Sun in 1881, it was called the New Orleans and La Joya

Smelting Company. In 1882 it was sold to the Graphic Company. In 1885 it started full production and processed ores from the Graphic mine for three years. It was closed down in 1888. A third smelter had been built in Socorro in 1885, but it was short-lived as decreasing lead prices forced both mining and smelting to shut down.

Magdalena became the supply center for the mining camp and thus underwent tremendous growth and prosperity. Kelly, like the camps in the Mogollons, would disgorge its wealth throughout the county, attract its share of good and bad elements, and finally decline in the 1920's to become a ghost town.

There was other important mining activity in the district. On the Socorro Mountain that rises directly west of the town of Socorro (and locally bearing the name "M" Mountain after the symbol, carefully whitewashed each year by freshmen at New Mexico Institute of Mining and Technology), silver deposits were found. These discoveries, plus the benefits from the other mining camps, would awaken the sleepy village of Socorro, and within a short time it became the important town in the district. Its location made it the general supply terminal for all of the district's mining camps. Located on the main line of the Santa Fe Railway, it had access to all necessary supplies for the mines, and to markets for the mineral products pouring out of the Socorro District. With the discovery

of silver in the nearby mountains, it also became a mining camp in its own right. The discovery was made by a man named Hanson, but much of the preliminary work was done by William Courtis. Although a 10-stamp mill was built to handle ores, the production from the mines was disappointing. The two principal mines were the Torrence and the Merritt and they produced only about $750,000 over their lifetime. The Merritt is still being used for scientific research purposes by the New Mexico Institute of Mining and Technology. During the peak of the boom in the Socorro District the town of Socorro not only became the post populous and most important in the district, but it also became one of the largest in the entire territory.

The enthusiasm for mining and the special conditions that prevailed in the middle eighties led the territorial legislature to locate the New Mexico School of Mines in Socorro in 1889. By 1892 the new college had opened its doors amid great excitement. The building housing the school was the most modern educational facility in the American west. Its purposes were stated in the enabling act:

> "to furnish facilities for the education of such persons as may desire to receive instruction in chemistry, metallurgy, mineralogy, geology, mining,milling, engineering, mathematics, mechanics, drawing, the fundamental laws of the United States, and the rights and duties of citizenship."

The school's name has changed to the New Mexico Institute of Mining and Technology to reflect its wider range of instruction and research including physics, astrophysics, computer science, geology, biology, chemistry, the humanities and fine arts, among its many subjects.

Mining in the district was not limited to metals alone. Carthage, south and east of the town of Socorro, became a major producer of coal; coal which supplied the mills and smelters with their necessary fuel requirements, coal used by the Santa Fe Railway to power their locomotives.

The coal at Carthage had been mined on a small scale since the 1850's. In 1861, it was reported the Army troops from Fort Craig had "opened an important coal mining area" north of the fort. This was the same area worked from Socorro and was the beginning of the famous Carthage coal field that produced a considerable tonnage of coal until the middle of the 20th Century. It was this plentiful supply of coal, and the limestone from nearby Farley (Fraley), that was a distinct advantage for Socorro in helping determine the location of smelters during the mining boom.

But coal, too, temporarily passed from the scene as an important mining operation in the state and in the district. The failure of the mines and the smelters and the gradual conversion from steam to internal combustion engines by the railroads made coal mining unprofitable.

One of the more interesting milling operations in the western part of the district was built on Whitewater Creek south of Mogollon. One of the gold discoveries was just above Whitewater Canyon. The mines included the Confidence, Bluebird, Blackbird and Redbird. In 1893 John T. Graham built a mill on Whitewater Creek to handle the ores from the mines. The canyon is a narrow sheer-walled gorge with a rapid drop out of the mountains. The mill was constructed where the canyon ended and the creek entered a wide valley. Here the town of Graham grew around the mill.

But the canyon presented special mining and milling problems to the Helen Mining Company which operated both the mines and the mill. The creek frequently dried up at the mill site, while up the canyon there was always a good supply of water. The company needed the water for generating electricity and for the town. In 1893 a 4-inch metal pipeline was constructed up the north side of the canyon a distance of about three miles. In 1897 a second pipeline (18-inch) was built parallel to the smaller one to supply water to run a larger generator. The larger line was in constant need of repairs and the workmen who had to walk this line for maintenance named it the "cat walk". Despite the large investment in time and money, the operation at Graham was a disappointment. The mill was inefficient and the same year it was built the price of silver dropped drastically, reducing badly needed revenue.

Another minor mining area that developed in the Socorro District was Rosedale Canyon on the eastern side of the San Mateo Mountains, where gold was discovered in 1882. A small rush resulted, but it was quickly snuffed out in raids by Apache Indians. Most of the ore mined in the 19th century was treated at the site in a 10-stamp mill and the concentrate sent to a smelter in El Paso for final processing. The district, never more than a small camp with a few miners, produced sporadically until the 1930's.

One other mine should be mentioned, even though it was not located in the Socorro District, because of its impact on the smelting operations at Socorro. The first discovery of copper at Hanover, near Santa Rita in southwestern New Mexico, was made in 1859. The smelters at Socorro were using iron nodules that had been picked up from the top of the ground in the area north of Magdalena and hauled to the smelters. This supply was limited, but in 1891 at the Hanover, which had been idle in the 1880's, iron and zinc that had been bypassed during the copper mining days, brought the mines back and the iron ores were shipped to the smelters at Socorro and enabled them to keep running full blast during the mining boom in the area.

THE LIVESTOCK INDUSTRY

While mining and the activities associated with mining were instrumental in causing rapid economic growth in the district, livestock raising also served as a stimulant. Again the rapid development of this industry was tied directly to the settlement of the Indian problem. The areas of the district subject to extensive grazing operations were located in regions previously controlled by the Apache. The best grazing land and the areas open to exploitation were in the western portion of the district. The lands on the western fringes of the Magdalenas, the grassy San Agustin Plains, the hills and valleys immediately surrounding the plains, and in the mountains of western Socorro County (now Catron County), were subjected to a land rush. Although the numbers of people engaged in livestock production never rivaled the numbers engaged in mining, the area between the Rio Grande and what is now the Arizona line became a cattleman's empire. Ranches and homesteads sprang into existence, and cattle roamed the thousands of hills and valleys of the district. The cowboy and the miner rubbed elbows in the towns and exchanged pleasantries, and unpleasantries. Cattle by the tens of thousands flowed from the ranges of the Socorro District to help feed the hungry millions in eastern cities.

Stock raising rapidly expanded in New Mexico after 1870 but

this had its beginning in the eastern part of the territory, spreading to the Socorro District in the early 1880's. In 1870 there were an estimated 57,000 head of cattle in the territory and by 1880 the number had grown to 348,000. This growth was related to the growing population, the mining camps, the increased size and activity of the military and Indians who were brought under their control, and, finally, the advancement of the continental railroads.

Attracted by the vast expanse of open range, cattlemen entered the area in southwestern Catron County around present Reserve and west and northwest to the Arizona border, with their herds of longhorns and began the cattle industry that remains the central historic theme. During the 1880's the number of these ranches increased rapidly and the heyday of the cowboy began. This came at a time when mining was booming in the Mogollon and Silver City areas to the south and life was anything but tranquil. Rustling and gunfights characterized the area from about 1880 to 1900 and the cemetary at the old W. S. Ranch, one mile north of Alma on U. S. 180, contains the graves of some of those who were too slow on the draw. It was the W. S. Ranch that once employed a man who was known as Jim Lowe, but who was later discovered to be the well-known bank and train robber Butch Cassidy. Cassidy and some of his gang used the area as one of a series of retreats.

In spite of Apache raids, the settlers managed to hang on and

a number of small towns were established. Discharged soldiers are credited with founding Milligan's Plaza (now called Reserve) about 1874. Alma, another early village, served for a time as postal depot for almost all of the area and reached its peak about 1880 as the important center of ranching commerce. Clairmont (Clermont), about five miles north of Mogollon, dates from about 1879, but after five years the residents moved to Cooney because of the hostile Apaches. Fullerton was founded about 1880. Luna, originally known as Herber and later as Grant, was settled by Mormons in 1883. The Mormons built a small fortress in the center of the townsite and dug their main well inside its walls. The village increased quickly to about fifty families. The name Luna honored an early sheep raïser in the area; a man who was a long-time leader in the Republican party, Don Salomon Luna. The Mormons also settled at Pleasanton.

Stock raising continued to expand and the ambitions of large ranchers led in some places to serious overgrazing (this was especially true of sheep) which resulted in erosion. Even though the Plains of San Agustin once lay under the waters of a prehistoric lake, the area has not been wet in recent times. Hopeful farmers in the area often found this a serious barrier to their work. Greengap, north of present Horse Springs, settled by homesteaders who tried to establish farms, failed because of the lack of adequate rainfall and the uncertainty of finding ground water. The farmers

finally abandoned the area and it was returned to ranching.

The Tres Montosas Mountains are west and north of Magdalena. They are reported to have been the headquarters for many notorious outlaws among whom was Joel Fowler, whose career was brought to an abrupt end in Hangman's Alley in Socorro. Pete Evans, son of the late rancher and author, G. W. Evans, operates a ranch with headquarters in the mountains. The Magdalena Cowboy Camp Meeting, begun many decades ago by the Evans family is still being held each summer at a permanent site just off the North Lake Road west of the Tres Montosas.

One of the critical problems facing the rancher during the early days was access to markets. Local markets (Indian reservations, small towns or mining camps) provided only limited opportunities. The primary markets for livestock products (meat, hides, wool) were in the eastern states. It became necessary, following the Civil War, to find ways to reach those markets. The building of the western railroads solved part of the ranchers problems. It was left to him as to how he would get his product to a point on the railroad. The customary method was to drive his sheep or cattle across country (usually public domain) to the nearest railhead. This practice had proved successful in Texas and in eastern New Mexico and would be utilized by the ranchers in the Socorro District.

The New Mexico Cattle Growers Association and the New Mexico

Woolgrowers succeeded in getting the Secretary of the Interior to withdraw lands for the Magdalena Stock Driveway on February 23, 1918. The driveway, which ran from Arizona to the railhead at Magdalena, though in use from the early 1880's, was greatly enhanced when fencing and wells were constructed at about ten-mile intervals along its entire length. And the five to ten mile width provided ample forage for the cattle and sheep as they slowly moved along its path. This improvement was made by the Civilian Construction Corps in the 1930's, and the old campsite is still visible about five miles east of the Agustin well just north of old U. S. 60.

The peak year for the driveway appears to have been in 1937 when some 50,000 sheep and 25,000 head of cattle traveled the trail, including the fork that extends from Datil to Reserve, to the shipping pens at Magdalena. However, use of the driveway decreased after World War II with the advent of the heavy trucking industry and better roads, and in 1966 the driveway was reduced to about one-half its previous width and the Datil-Reserve fork was eliminated. The closing of the driveway began in 1972 and it is now utilized by grazing permittees. It has now been recommended for inclusion in the National Register of Historic Places.

During the late Spanish period, the Mexican period,and well into the American period in the Socorro District, the primary livestock emphasis was on sheep raising. While there were areas domi-

nated by cattle, the overall production in the district was predominantly sheep. This pattern gradually changed during the 1920's and 1930's. The taste of the American people for beef became more intense, and cotton began to compete favorably with wool and in fact came to dominate the American market. Following World War II this process was accelerated. Synthetic fibers added to the depression in the wool market and the demand for beef grew at a rapid pace. The result was the demise of sheep raising in the district. Today the district is completely dominated by the cattleman. While there is some sheep production in the district on private lands or on lands administered by the Forest Service, there are no sheep grazed on the National Resource Lands.

TRANSPORTATION

While the Socorro District has never been the center of great commercial activity, all three cultures (Indian, Spanish and Anglo-American) have participated in trade and commerce. In addition, the district has benefited from important trade routes passing through the district. The effect on commercial activity resulted in the development of trails, roads, and eventually railroads and interstate highways.

The Indian was an extensive trader. Items from all parts of North America are found in New Mexico among the ruins of ancient pueblos. At the same time, New Mexico products moved vast distances to be exchanged. Internally there was constant travel to trade between the various pueblos, or between the pueblos and the nomadic tribes. But the trails they used are largely lost. They were developed for human traffic and not for vehicular movement. Only in rare instances can one distinguish an ancient Indian trail. Usually they were in regions easily traversed and have since been developed as more modern roads. More extensive archeological study of the Socorro District might provide a clearer picture of Indian trade and the routes used in that trade.

The only significant development during the Spanish period was along the Camino Real in the Rio Grande Valley. The trade pass-

ing over the Royal Road had little effect on the district. Many travelers passed through the district, to and from Santa Fe. However, the economic impact was minor during the Spanish period. Nevertheless, this trail should be identified, where possible, and included as one of the great historic trails of the Southwest.

Spanish caravans moving along the Camino Real utilized two basic methods of carrying freight. Quite common was the mule train. A mule could carry about 300 pounds of goods and could move relatively quickly, thereby achieving good distance for a day's work. Most of the freight passing through the Socorro District was transported by mule train. The breeding and training of mules for transport and for use in the mines of Mexico as draft animals was an important industry in Mexico.

Wagons were the second method of transport. Usually pulled by oxen, the Spanish wagon was a cumbersome, two-wheeled vehicle, with only moderate cargo capacity. The wheels were frequently made of solid wood, faced with leather or iron, riding on solid log axles. Breakdowns were frequent and presented problems of replacement of equipment, for there was little wood available along much of the trail. So, many of the wagon trains carried along wood for these replacements and this added to the number of wagons required to make up a wagon train. In addition, the oxen moved slowly and the wagon trains were limited to only a few miles a day. They were

utilized for the transport of large or bulky goods, such as the personal belongings of the colonists. For general transportation the pack mule was much preferred.

The pastoral nature of New Mexico prior to the American Civil War, which spanned the Spanish, Mexican and American periods to that time, did not require an extensive network of roads. The few main trails for importing and exporting goods, such as the Santa Fe trail from Missouri and the Camino Real from Chihuahua, were sufficient. It was a slowly paced life, largely self-sufficient; truly the "Land of Manaña". But mining changed all that. The ores being extracted had no value at the mine site. Whether raw ore, concentrate or bullion, their markets were far from the canyon, mesa or mountain fastness. Roads were needed; roads that could handle heavily laden ore wagons, freight wagons hauling in the needed tools, food supplies and whiskey; roads for stagecoaches to bring in people--and more important-- mail from home and newspapers from the east or west coasts, or from Santa Fe. There was no paternalistic governmental agency to turn to--no State Highway Department, no United State Department of Public Roads, no Bureau of Land Management--just the miner's needs, capital and labor. Every mining camp in the district was quickly connected into a growing system of roads and trails across the mountains, plains and deserts of the district. The roads crossed over, went through, and went around some of the most difficult country

as well as some of the most beautiful. The miners did not choose their camp sites--nature did that for them in ages past, when the ore bodies were laid down or outcrops eroded away leaving gold in ancient stream beds. The roads had to be built to the mining camps, no matter how difficult the terrain. By the time the railroads came, a system of connecting roads was already emerging and needed only some adjustments to connect the older roads into the railroad system.

Many of the roads hacked out of the mountains and deserts to serve the mines during the 19th century still serve us today. In some cases they have been regraded, paved and drained and instead of creeping along at a snail's pace with danger at every turn, we now travel them at high speeds--with danger at every turn. A few of the old roads are still there, much as they were almost 100 years ago,and on these roads, those with steady nerves can still visit the old 19th century mines.

Transportation was always a problem in the Mogollon Mining District, with the smelters being located at Silver City or Socorro. Holm O. Bursum, Sr., was elected sheriff of Socorro County in 1894 and reelected in 1896. He understood the problems of transportation, having once been in the freighting business, and during his tenure as sheriff built a road from Mogollon to Willow Creek, shortening the distance to Socorro about 60 miles. This road is still in use today and is known as "The Bursum Road."

Over the developed roads traveled a variety of vehicles. The Americans had developed numerous types of wagons to haul freight across the Santa Fe Trail, the Oregon Trail, and other cross-country trails that developed after 1840. These wagons, with four spoked, iron rimmed wheels were capable of carrying large volume heavy loads. Sometimes pulled by oxen, but as often by horses, they revolutionized freight movement in the Southwest. They were adapted to hauling ore, general freight and timber and on the trails they became the "mobile homes" of the period. Their range varied, but rarely did a wagon make more than 10 miles a day and frequently much less. From two to twenty teams of horses were used to pull one of the massive wagons.

A different vehicle was required for mail and passengers. There was no set pattern for stagecoach construction, but the most famous was the Concord coach. Constructed of only the finest wood, iron, ox-hide leather and brass, it was oval in shape and rigged with through-braces (heavy leather straps) which caused it to roll rather than jerk or bounce on rough roads. They had leather upholstery, curtains and were generally colorful--depending only upon the wishes of the buyer. They had seating in the interior for nine passengers. A seat for the driver and guard was on top, as was room for mail and other valuables. Also, if necessary for short runs, there was room for about a dozen more passengers on the top. These coaches weighed nearly 2,500 pounds and cost from $1250 to $1500 delivered.

Most of the coaches built during the last half of the 19th century were used on western roads, many of them in the Socorro District. While some drivers preferred mules, most of them preferred horses and they were usually pulled by four or eight horse teams.

Travel on the stages was an interesting, if not a comfortable, experience. Long hours, crowded coaches, dusty and rough roads, the terror of mountain raids and the constant bounding or rolling motion, were the lot of the stage travelers. Not infrequently the monotony was broken by Indian attacks, which left the passengers badly frightened, if they survived at all. Despite the hardships, the stages were popular and frequently there were waiting periods of up to ten days to get on one.

The stage stations spaced along the way, either as relay for men and horses, mail distribution points or as rest stops for passengers, frequently left much to be desired. The food that was sometimes available at these stations was generally rated from "plain" to "terrible". Salt pork, beans, hard tack, or soggy biscuits and a "miserable apology for coffee" were the common fare. Thus, many travelers carried their own food rather than take any chances on the food served along the way. In some instances, particularly at the important way stations in villages and towns where time was allowed for more leisurely or overnight rest stops, good food and lodging were available. Most of the stations, however, were designed

for the benefit of the drivers and livestock, not for the passengers.

The main stagecoach route north and south through the Socorro District followed the Chihuahua Trail except that it crossed the Rio Grande about San Pedro, which had been built on or near the site of the old Indian village of Senecu and had become an important stop on the Chihuahua Trail, then continued up the west side of the Rio Grande through Socorro and recrossed the river about La Joya and continued up the east side.

Branches were established as needed and most owners and operators tried to obtain mail contracts to make their lines more profitable. One line ran from Cooney to Socorro. Another served Riley by using the Rio Salado bed when it was dry, there being no service when there was water flow in the river. One of the largest freight lines ran from Socorro to Prescott, Arizona and was in operation until 1910. An important passenger and mail route ran east from San Pedro to White Oaks and Roswell. In the southwestern area of the district a route ran from Silver City to Springerville, Arizona, serving Reserve, Alma, and other stops along the way.

The final historic pattern in transportation was the coming of the railroad to the district. In 1881, the Santa Fe railroad built its line through the district to Socorro, San Marcial, and on to Deming. For a brief period this was the main line of the Santa Fe between Kansas City and Los Angeles. It was mostly responsible for

the great growth of the town of Socorro during the middle years of the 1800's. In 1888, the Santa Fe completed its main line from Belen to the west coast, relegating the line through the Socorro District to that of a feeder line. Socorro quickly declined.

Two spur lines were built in the district, both to serve mining areas. The first was built to Magdalena, with a spur to Kelly, in 1883 to haul lead ores from the Kelly and Mystic mines to the smelters in Socorro. This was an extension of about thirty miles and served as a great stimulant to mining in the region as it opened up better markets, larger volume of production, and allowed an easy and cheap flow of machinery into the district. Also, the railhead at Magdalena became an important shipping point for the livestock industry in western Socorro (now Catron) County. The Magdalena Livestock Driveway developed to tap the railhead. A second spur was built later to the coal field at Carthage. The coal was primarily used by the Santa Fe for its locomotives and by the smelters in Socorro. There was also a small local residential market.

AGRICULTURE

Agriculture as a primary economic resource in the Socorro District was most important during the periods of Indian occupation. Spanish agriculture was limited to a very brief period at the end of the colonial empire (1821) and to very isolated areas. Other economic pursuits became much more important during the period of American dominance, such as stock raising and mining.

Areas of Indian agricultural development were in the Cibola culture area in the western parts of the district and in the Piro culture area east of the Rio Grande. In both regions only the most primitive methods of agriculture were practiced. Mostly dry farming operations were the rule. There is little evidence that irrigation was used either by the Piros or the people in the western part of the district. There may have been some field check dams, hill contouring with rocks, or other primitive methods of utilizing sheet water run-off, but there is no evidence that diversions, laterals or ditches were used to divert surface water from water courses. Since minimal archeological research has been done in the district, it is most difficult to evaluate the level of Indian agriculture. Irrigation techniques were known to a variety of Indian groups in the Southwest, and it is possible that some of them were known to the Indians in the Socorro District.

Indian agriculture was subsistence agriculture, that is, the products were utilized to support the community raising them, and they were not used for trade or profit. While the Indian practiced extensive trade with other groups, some at a considerable distance, food products were rarely traded. Commercial agriculture was not known to the Indian.

The Spanish began to penetrate that part of the district in the Rio Grande Valley following 1800. They brought with them their irrigation agricultural system. This included not only the methods and technology, but a well-developed social system that evolved around irrigation agriculture.

Spain had a long heritage of irrigation practice, probably learned from the Moors who controlled Spain, at least in part, from 711 to 1492 AD. The very work acequia, the Spanish word for ditch, is from the Arabic. It was natural that the Spanish brought with them to New Mexico this deep heritage. The remarkable part of the culture built on irrigation was not so much the engineering works or canalization and the brush and rock diversion dams, but the social order of villages revolving around the necessary operation and maintenance of these works and systems. They Mayordomo de la Acequia, or ditch master, was one of the foremost citizens of the village, for it fell upon him to placate every farmer who felt that he did not get his fair share of water and also to prod each irrigator to

contribute his share of the labor necessary for maintaining the system. But this social order, highly dependent on subsistence irrigated farms, was equally dependent on the grazing resources in the adjacent non-arable hills and in the forested lands. The livestock industry was the source of those animal products--wool, leather, meat, and draft power--necessary to supplement the agricultural products, beans, melons, corn and chile. This kind of system, so dependent upon the technical capability brought by the Spaniards, was also far advanced when compared to the Indian systems, at least in terms of efficiency and production. A legal system administered generally throughout the Spanish colonies reinforced both rules on water use and land ownership, giving great unity to the village systems found in New Mexico. Irrigated agriculture, both from a technical as well as a social point of view, was already a way of life for the Spaniards when they settled in the Socorro District after 1800. It should be pointed out, however, that the Spanish State did not participate directly in local affairs in such matters as internal improvements; that is, they did not build the dams, ditches, and roads. This was left to the individuals, recipients of land grants, and to communities. During the Spanish period, only the Rio Grande Valley was subjected to any agricultural development. The western parts of the district with adequate surface water was controlled by the Apache.

The period of Mexican dominance, 1821-1846, was only a continuation of the processes begun by the first Spanish settlers. There was a gradual filling in up and down the valley, but the system remained essentially the same. Holdings were small, most of them not more than 2 to 5 acres. They were also bound to the Rio Grande Valley because of the Indian menace in the rest of the district.

The American period, beginning in 1846, saw significant changes in agricultural development in New Mexico. With American occupation came new influences. The Anglo-Americans brought capital and technology, two items desperately needed. They brought increased trade with few, if any, restrictions, a boon to New Mexico's economy and the economy of the Socorro area. They brought a dynamic, ambitious, land hungry, agressive, and Protestant culture, one which tended to look down on the quiet, conservative, agricultural-pastoral, Catholic Spanish, and Indian cultures. They came to dominate and they dominated. Also with the American came a new legal system, one that the Spanish and Indian population found hard to understand. It threw land ownership and water rights status into a state of confusion which led to misunderstanding, fraud, and bitterness. The result was a sharp division between conquerors and the conquered. The Spanish village ditch irrigation culture tended to become more isolated, more withdrawn and more determined to hold what they had. The newcomers--and many Spaniards whose lives were more influenced

by commerce, the professions and government--looked to quite a different pattern for developing the agricultural resources of New Mexico.

Another outstanding difference in cultural patterns was that the Indian and Spanish farmers were essentially subsistence farmers, while the incoming Americans brought with them a tradition of commercial agriculture. American agriculture was on a much larger scale, employed considerable capital, and ultimately needed to develop vast amounts of water to satisfy its need. In addition, the American was not satisfied with the quiet, isolated life that was so much a part of Spanish New Mexico, for his culture was expansive and mobile. Finally, the American federal government had established the concept of federal responsibility for most national internal improvements, which included waterways, flood control, and ultimately irrigation systems in certain cases.

Gradually some of the most pressing problems of the district were solved. The Apache were controlled by the 1880's, mining began to dominate the area, and trade patterns were established, along with roads and trails. A transportation system of sorts emerged. Hand in hand with these developments came expanded agriculture. Two primary areas of agricultural development and several minor areas emerged during the last half of the 19th Century.

Development of the agricultural resources of the Rio Grande

Valley area of the district continued to expand, until most of the Rio Grande flood plain was under cultivation. The primary crops were wheat (until the 1930's, when midwestern wheat began arriving in large quantities, curtailing wheat production in the valley), livestock feed (grasses and grains), and a variety of local truck farming products. Some cotton production eventually came into the district, but the area is too far north and cotton production is marginal to unprofitable.

There was also an agricultural development in the western part of the district along the Tularosa and San Francisco rivers, the most important perennial streams west of the Rio Grande Valley. While never an important commercial area, a considerable irrigation agriculture developed, mostly around livestock feed and family subsistence needs.

Other areas were localized and isolated, dependent on adequate surface water for irrigation. Some effort was made at Horse Springs (Catron County) with little success. There was a minor effort along the eastern part of the Bear Mountains (north of Magdalena) utilizing a spring and a series of flumes and terraced garden areas, with little success. Most of the district, outside the two important drainages (Rio Grande and San Francisco rivers), simply did not have the surface water or the flood plains necessary for irrigation agriculture. The district is too arid for dry farming techniques.

An overall evaluation of agriculture in the district indicates that it is not the prime economic activity today that it was in the past. Indian and Spanish occupants depended entirely on agriculture for survival. Subsequent economic activities have turned to other pursuits, including livestock production, mining, trade, and commerce.

WATER CONTROL

In the Socorro District only modern water control systems are readily apparent. If there were important systems developed by the Indians they either have not been discovered or they have been overwhelmed by newer systems bult at later periods. The same is largely true of Spanish influences, and even Mexican or early American influences. One can, however, speculate on early developments based upon knowledge gained from the study of other areas.

Until the beginning of the Christian era in our dating system, man in the Southwest in general and in the Socorro District was a food gatherer and hunter. His simple technology was directed toward developing tools for hunting; the remainder of his food supply came directly from nature. After the Christian era opened, man in the Southwest evolved into an agriculturalist, and with that development he redirected some of his efforts toward water resource control.

In the mind of aboriginal man in New Mexico water came from benevolent gods and was, like the Indians themselves, a part of nature. During the thousands of years when the Indian was the sole occupant of the Southwest his use of water, except for drinking, was scanty and largely accidental. Primitive man was not a technologist, and he did not distinguish his technical acts from his natural ones. He saw the lighting of a fire or the use of a spring

or stream in the same sense that he saw his ability to walk or to use his arms. The art of invention, so much a part of the culture of modern man, was not revealed to primitive man. In the course of constant manipulation of a multitude of objects in nature, primitive man suddenly and by mere chance came upon a new and useful device. Invention in primitive society appeared as another aspect of nature, a part of nature's power to furnish man with certain novel and useful things. Thus it was with water. The Indian utilized what he found free in nature or was able to imply from nature.

It is also important to point out that primitive man in the Socorro District was highly subject to climatic change. Changes in effective moisture could cause dramatic change either in food producing techniques or in population shifts. The Indian, because of the low level of his technology, could not alter nature very much or even adapt to nature by technical application.

When the possibility of domestication of plants was revealed to man, so was the possibility of water control. Despite the fact that the Indian's technology was very limited, he did utilize what little he had for the development of water resources. Only in isolated high mountain valleys did enough rain fall for dry farming techniques to be applied. Elsewhere in this dry land, natural rainfall had to be supplemented in some fashion.

Indian need for water technology was expressed in two kinds

of development: that evolving from his need for drinking water and that emerging from his need for water for his crops.

Domestic water, in most cases, came from natural sources. The pueblos of the district were generally located by streams or springs and little or no development was necessary to acquire water. In some instances, human labor and whatever primitive tools were available were applied to improve a natural water source. These took simple forms. Small brush, dirt, or rock dams were frequently built in streams to form small pools from which to draw water. Springs or seeps were often dug out, thereby forming pools or cisterns. A well has been excavated at Trechado Springs on Mariana Mesa south of Zuni: it was a walk-in well or clay pit, or both. On Turkey Ridge, just west of Gran Quivira, is an abandoned Saline pueblo of nearly 200 rooms which has a very evident cistern nearly thirty feet across. It was dug down four to five feet to a gravel layer which at one time carried water to fill the artificial basin. At Acoma Pueblo, nature provided the cistern, or as described by Fray Benevidas "there is a cistern which God made in the rock itself." In the winter the Acoma people collected all the snow they could into the cistern to aid in their water supply. To keep the water clean they kept the area around the cistern carefully swept. Beyond these simple kinds of effort, little could be done to improve upon sources of domestic water.

The Indian's need for water for his crops was a critical force in his life style after a sedentary agricultural society emerged. When natural rainfall failed to produce enough water, he was forced to utilize his limited technology and his limited knowledge of natural law to increase the water in his fields; in short, he had to irrigate. Direct evidence varies from site to site, but enough has been found by archeologists to indicate that the ancient inhabitants possessed considerable skills in the art of irrigation and water control.

While there was little technology used in any of the efforts to develop water, Indian culture was deeply committed to water control. Even utilizing his technology to the fullest the Indian was still subject to the whims of nature. Lack of rainfall made mockery of his efforts at stream or field check-dams. Too much rainfall washed out his efforts in a flash. Water control to the Indian was in the hands of his gods. Religious cults devoted to the worship of water prevail throughout the Socorro District and numerous assumed ritual objects have been found associated with streams or surface water.

The Indian's quest for water was a mixture of reliance on his native gods, the ability of nature to supply water as rainfall and as streams and springs, and on the rudimentary technology he was able to muster. These later efforts were usually primitive, inefficient, and undependable. Nonetheless, the Indians were able

to build, at several different periods, substantial societies based upon irrigated agriculture.

The coming of the Spanish, starting with the colonization by Juan de Onate in 1598, did not greatly change the life styles of the people of the region. The Spanish became agriculturalists as were the Indians before them. They were subject to the same natural forces typical of arid lands as were the Indians. Only in the area of their technology was there a marked improvement. Indian technology reflected stone age tool making, with all of the limitations this suggests. Spanish technology, on the other hand, was representative of sixteenth century European culture, a jump ahead of several milleniums when compared with Indian levels. This meant dramatic change in New Mexico.

The Spanish brought advanced metallurgical techniques and metal tools which made control of their environment easier. While the Spanish in New Mexico never had metal tools in any great quantity, due to the difficulty of transporting them from Mexico (there was little local production during the colonial period), enough were available to give the Spanish a pool of capital which was used to manufacture other tools, mostly from wood.

The Spanish also introduced domesticated animals from which were produced various food products, fuels and leather. Leather was widely used for making buckets, clothing, harnesses, wagon springs,

fastening devices of all kinds, and often as a tool in the construction of ditches or other irrigation works.

Added to the new technical capability were engineering skills which, while still rudimentary, were far in advance of the Indians. In New Mexico the water control works were simple, and more reliance was placed upon the "art" rather than upon the "science" of irrigation. The Franciscan fathers who controlled the Indian missions, and the simple soldier-farmers who had to make a living in arid New Mexico, knew the general theory of surface water flow, and were able to apply it in a limited fashion.

As the Spanish consolidated and expanded their control over the region, they also expanded their irrigation systems. The Pueblo revolt of 1680 halted them temporarily, but following the reconquest by Diego de Vargas in 1692, the development of irrigation continued. Specific information on each system which evolved is scarce. Primitive hoes and shovels of wood were used because of the absence of iron tools at the time. Earth was moved on rawhide drawn by draft animals or back-packed if animals were unavailable. Main acequias constructed with these simple tools averaged from three to five yards wide and from two to six feet deep.

The fact that most valleys in central New Mexico that had perennial flowing water, even in small amounts, had an irrigation system and supported a village of Indians or Spanish farmers is evidence

of the persistence of an energetic people utilizing to the fullest the available technology.

In the Socorro District Spanish water control systems were only in evidence in the highland valleys, and only after 1800. The influence is, therefore, negligible. There may have been some early influences brought by the Franciscan missionaries, but, if so, the evidence has been destroyed by subsequent systems.

THE AMERICAN QUEST FOR WATER

Lasting and deep American influences in New Mexico began with the opening of the Santa Fe Trail in 1821. There had been earlier contacts, but they were passing and had not resulted in many Americans living in the territory or district or in making a very lasting contribution to its life and culture. After 1821 the American presence, resulting from increased trade relations, gradually turned New Mexico's focus of interest from Mexico to the south toward the United States to the east. As was the case so often in other areas of the West, it was not long before the flag of the United States followed the people. When General Stephen F. Kearny came in 1846 at the head of an invading army, the citizens of New Mexico chose not to resist and the territory was quickly incorporated into the United States.

But the conquest of the hostile Indians was necessary before any expansion was possible in the Socorro District.

Irrigated agriculture expanded rapidly in the 1880's, and particularly after 1890. There was a decline in the cattle industry in the middle 1880's which forced many settlers and ranchers to find a more suitable use of their lands. By 1888 investors were turning from ranching to the rapidly developing irrigation companies being formed. By 1892 there were 88 such companies, and it is es-

timated that 40 percent of the land brought under irrigation during the decade of the 1890's was by these companies.

The final 20 years of the 19th Century brought with them the much needed scientific principals and the accompanying technology to initiate a wholly new set of concepts and policies in terms of water resource development. And during the first half of the 20th century these patterns were rapidly advanced by use of large amounts of investment capital.

With the availability of adequate technology and a rapidly developing federal and state water policy, water control went ahead at a rapid pace. As the news of the first drilled irrigation wells spread after 1900, formal studies were made to locate suitable subsurface water sources. Some efforts were made by hydrologists using traditional methods and others by drillers actually putting down experimental wells.

Surface waters were largely appropriated,although much of it was lost by runoff because of limited storage facilities. Irrigation using subsurface water made some progress, however, by drilling numerous shallow wells for small-scale irrigation. A large producer flowed about 100,000 gallons per day. But machinery for pumping enough water from these shallow wells was lacking. Windmills were most commonly used but sometimes small, inexpensive gasoline engines supplied power for the pumps. The pumping problems and drilling

techniques were considerable and much effort was made to improve the capacity. Important advances were made, but they were not put into general use until after World War II. This involved the building of large storage facilities for holding excess floodwaters until they were needed and power sources to pump large amounts of subsurface water from larger and deeper wells.

Probably the number of wells for livestock use made up a majority of the total wells in the district. The amount of water produced by these wells made up only a small fraction of the total water produced. The rancher and small water user, both outside the boundaries of the large development projects, used a variety of techniques, often based upon trial and error and upon "home-made technology." They showed a great deal of ingenuity, and in some cases considerable knowledge of engineering and mechanical skills, despite the fact that they had little formal training in these areas. They went to great lengths to get the water that was necessary to their livestock operation. Frequently one can read much of the history of the types of technology applied by the ranchers by visiting field sites, and often from a single site. West of Datil and just south of Highway 60, is a well and watering site which shows many generations of technology, all within a few yards of each other. The old windmill tower, probably constructed around the turn of the century is still in use. The mill has fallen off and lies nearby. On the tower

are two generations of pumping devices: an old one-cylinder gasoline engine, probably dating to the early 1930's, which is no longer serviceable; and a new electric pump which now draws water from this very old well. The water is carried from the tower across a narrow arroyo to watering tanks on a bench. The remains of the oldest tank, a simple earthen tank, can still be seen, but is no longer in use. On part of the earthen tank a stone masonry tank was constructed but is now crumbling and is mostly gone. Currently a galvanized steel tank is receiving the water and redistributing it through a system of plastic pipes to several watering tubs hundreds of yards from the well. The foundation of the new steel tank was made, at least in part, from the remains of the masonry tank. Such sites can be found throughout the district. The technology applied by the rancher in his search for water is a remarkable story.

The Socorro District was subjected to the full range of applied technology and large scale government construction of water control systems. Primary evidence is found in the Rio Grande Valley, but considerable erosion control systems, flood control, and even some water storage has been accomplished in a variety of areas.

Three kinds of water control systems stand out as far as the Socorro District is concerned. Most obvious is the windmill. Everywhere, in the river valleys, on the high mesas, on the plains and in the mountains, the windmill has played a significant role in the

development of the country. They remain one of the main sources for domestic and livestock water.

Not so visible, but becoming more and more important as a source of domestic and livestock water, is the plastic pipeline. Pipelines have played an important role in the history of water supply since the middle of the 19th century. Several places in the district show evidence of use of wooden pipelines. The water supply of the town of Magdalena used to come from Hop Canyon through a wooden line which is still visible in places. The water supply now comes from wells. Ranchers moved water in wooden lines, or sometimes cement or metal pipes, for short distances to supply livestock. The problem of pipeline use on a large scale prior to World War II was the cost. The available lines were too bulky and too difficult and costly to put in. With the development of plastics by the petrochemical industry following World War II, plastic pipe became available. It was not only cheap, but easily put in. It has meant that water, once available only at or near the well head, can now be made available almost anywhere. Forage, once unavailable because of its distance from water can now be utilized. In recent years hundreds of miles of pipelines have been installed, both by individuals on private land, and by government agencies on public domain. It has had the effect of revolutionizing the livestock industry in the Socorro District.

In addition to pipelines and wells, modern technology has allowed the extensive development of earthen tanks to catch and store surface runoff. The earth tank relatively cheaply constructed by modern bulldozers or earth movers, while not as reliable as the windmill, has provided water for livestock where such water was not available in the past. They are an important link in the history of water control in the district.

PLANNING CONSIDERATIONS

In addition to those sites already determined and included on either the New Mexico or the Federal Register, the Bureau of Land Management feels that an adequate survey has not been made to determine if there are other sites equal to or more important than those already established. In light of the historic themes established in the narrative, there are a number of things that should be taken into consideration by any of the Bureau personnel while in the field, either specifically for historic site location or while undertaking other duties forthe Bureau. Since the district has been divided into units for purposes of administration and planning, the following lists have been prepared suggesting the kinds of historical sites that might emerge in each planning unit. Only field work will determine if physical evidence still exists.

Quemado and Driveway Planning Units

1. Indian ruins. Archeological sites of the Cibola culture are extensive and should be identified, documented, and where feasible, preserved.
2. Evidence of Apache influences. The Apache ranged widely in this area. This is most difficult archeology, but more knowledge is needed of early Apache influences.

3. The area will lack in Spanish and Mexican influences, except those relating to casual expeditions passing through the area.
4. Roads and transport. There were a number of important routes for transporting goods, mineral products, and people. Some effort should be made to determine these.
5. Water control. There are a number of applications which might be of historical interest.
    A. Indian influences. Field check dams, contouring, or other evidence of Indian water control.
    B. Well development. Hand dug wells, windmills, old power sources, other than wind, or other unusual technical applications in relationship to wells.
    C. Pipelines. Old lines, wooden or other, plastic or metal lines having historic importance.
    D. Tanks for water storage. Earthen tanks, rock tanks, metal tanks, or other storage facilities having historic importance.
    E. Special development of water for wildlife.
6. Livestock industry. Buildings, facilities for holding livestock, fences and fencing techniques, or other unusual sites related to the livestock industry.
7. Agricultural influences. In the San Francisco drainage may exist some residue of historic patterns of agriculture.

8. Mining. The Unit has within its borders some mining areas showing types of mines, equipment, or other historic aspects of mining.
9. Ghost towns or villages.

Cebolleta Planning Unit

1. Indian ruins. Again, mostly connected to the Cibola culture.
2. Indian sites associated with the modern Acoma and Zuni people.
3. Apache influences (similar to Quemado Unit).
4. Spanish influences. Possible Spanish trade routes from Rio Grande communities to Zuni. Possible signs of routes or artifacts.
5. Water control. Same patterns as in Quemado Unit.
6. Livestock industry. Same patterns as in Quemado Unit.
7. Roads and transport.
8. Ghost towns and villages.

Ladron Planning Unit

1. Indian ruins. Salado drainage.
2. Indian sites connected with the modern Alamo Indians.
3. Apache influences.
4. Possible Spanish or Mexican influences in the Puerco river valley in the late colonial period.

5. Livestock industry.
6. Water Control.
7. Roads and transport.
8. Mining (or prospecting).
9. Ghost towns and villages.

Stallion Planning Unit

1. Indian ruins. Mostly connected with Piro Indians.
2. Apache influences.
3. Spanish influences. The Camino Real on the east side of the Rio Grande. Possible early settlement sites along the fringes of the Rio Grande.
4. Mexican influences. Settlement patterns, architecture, modes of transportation, military influences, or other historic influences from Mexico.
5. Livestock industry.
6. Water control. Include with all other, irrigation, flood control, other government actions in or along the fringes of the Rio Grande.
7. Roads and transport.
8. Military influences. Forts, roads, telegraph lines, other military influences.
9. Mining.

10. Ghost towns and villages.

Obviously the themes are overlapping from unit to unit. Many of the themes suggested will not produce much in the way of physical remains. Nevertheless, efforts to determine what is intact, or partially so, should be made and an evaluation as to the historic value of the remains should be determined. This will take both time and effort, plus the utilization of experts in a variety of historical fields.

BIBLIOGRAPHIC ESSAY

The regions included in the Socorro District have not had very much historic literature written about them. A few books have been published which shed some light on the historic processes. F. Stanley has produced several books relating to the region, one on Socorro, one on Magdalena, and one on the mining town of Kelly. None are very good from an historical point of view. He frequently deals with legend and does not document his work very well. One must be careful in utilizing these works. Several other things have been produced which can be helpful in constructing the history of the district. Agnes Morley Cleaveland's No Life For a Lady describes in beautiful writing the ranch life in the district at the turn of the century. Although a novel, it does have an historic setting and gives some valuable information. Several personal reminiscences have been published describing areas in the district. Montague Stevens, Meet Mr. Grizzly, describes early life in the region of Horse Springs. Ruins of the Englishman's Castle can still be seen at Horse Springs. G. W. Evans, Slash Ranch Hounds, is concerned with the region of the Tres Montosas, west of Magdalena. William French, Some Recollections of a Western Ranchman, has some material on the Socorro District. He was one of the first to relate the story of Elfego Baca of Socorro and his famous gun battle at Reserve. Evan

Vogt and Ethel Albert's, The People of Rim Rock, is a sociological study of the population in the area northwest of the San Agustine Plains. It studies the Navajo, Zuni, Spanish-Americans, Mormons, and Texans.

Beyond these few studies, little has been done. They are helpful, but deal only with a few of the areas that have to be developed.

Some articles have been written about the area, but again there are very few. Some of the technical articles written by scientists about the geology of the region are useful, although they do not emphasize the history. The mining areas have had considerable attenion in technical journals, but again the history is meager. The total production in terms of articles relating to the district would not total more than several dozen, of which only three or four are historical in nature.

The historian relies heavily on manuscripts to construct much of the history of any area. The Socorro District is very poor in terms of this kind of source. There simply are not available any large bulk of materials relating to the Socorro District. Government documents are an important source. There are available the county records which give an insight into certain aspects of the region's history. Also, there are a variety of federal records available, such as the records of the Bureau of Land Management, the Department of Agriculture, the Soil Conservation Service and

the Bureau of Reclamation. These are valuable for certain aspects of the history. Still lacking, however, are those personal glimpses of the past one finds in the correspondence and writings of the citizens making the history.

Newspapers, another source of colorful history, are also lacking in the region encompassing the district. There were no towns in the district that had a daily paper and most had no paper at all. The papers that did survive are spotty and did not have an abundance of coverage. They were small, and were really extensions of the editor, rather than compilations of data. They are useful, but with very limited range.

Large general histories, dealing with the history of the state, or the American West, or some special theme, such as mining, or livestock, have references to the history of the district. These too, are useful and help establish the narrative.

The problem of writing such a history, then, is that of patching together a considerable quantity of vaguely related materials into something resembling a narrative. Generalization frequently must replace detail, since detail is lacking. In many cases one must infer developments from general knowledge, again because detail is lacking. The history that emerges can easily be subjected to criticism, but perhaps out of the incomplete narrative will emerge an interest that will bring to light more data and eventually a good

history of the area.

The following bibliography was utilized in the preparation of the narrative and will serve the reader as a guide to the history of the Socorro District.

Bibliography

Books and Reports

Abert, James W., Western America in 1846-1847, John Gavin (Ed.), San Francisco, 1966.

Adams, Eleanore B. (Ed. and Trans.) Bishop Tamaron's Visitation of New Mexico, 1760, Albuquerque, 1954.

_____, and Fray Angelico Chavez (Eds. and Trans.), The Missions of New Mexico, 1776, Albuquerque, 1956.

Agnew, S. C., Garrisons of the Regular U. S. Army - New Mexico, 1846-1889, Santa Fe: The Press of the Territorian, 1971.

Armstrong, Ruth W., High Country Vacationing in Magnificent Catron County, New Mexico, Rio Rancho Estates, New Mexico: Panorama Press, 1973.

Bancroft, Hubert Howe, History of Arizona and New Mexico, 1530-1880, Albuquerque, 1962.

Benevidas, Alonzo de, Fray Alonzo de Benevidas' Revised Memorial of 1643, (Ed.) George Hammond, Coronado Cuarto Centennial Publications, Albuquerque, 1945.

Brevoort, Elias, New Mexico, Her Natural Resources and Attractions, Santa Fe, 1874.

Christiansen, Paige W., The Story of Mining in New Mexico, New Mexico Bureau of Mines and Mineral Resources, Socorro, 1974.

_____, The Quest for Water in New Mexico, New Mexico Water Resources Research Institute , New Mexico State University, Las Cruces, 1973.

Clark, Robert E., New Mexico Water Resources Law, Albuquerque, 1964.

Cleaveland, Agnes Morley, No Life for a Lady, Houghton Mifflin Company, Boston 1947.

Cleveland, Norman, The Morleys -- Young Upstarts on the Southwest Frontier, Calvin Horn Publishers, Albuquerque, 1971.

Evans, G. W., Slash Ranch Hounds, University of New Mexico Press, Albuquerque, 1951.

Farmers Home Administration Water and Sewer Plans, Catron County, Publication of New Mexico State Planning Office, Santa Fe, 1970.

_____, Socorro County, Publication of New Mexico State Planning Office, Santa Fe, 1970.

Federal Register, A publication of the Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington: February 4, 1975.

French, Capt. William, Some Recollections of a Western Ranchman, Methuen & Co., Ltd., London, 1927.

Ferris, Robert C. (Ed.), Prospectors, Cowhands and Sodbusters, Washington, 1967.

Hall, Martin Hardwick, Sibley's New Mexico Campaign, Austin: University of Texas Press, 1960.

Hewett, Edgar Lee, et al., Physiography of the Rio Grande Valley, New Mexico, In Relation to Pueblo Culture, Bureau of American Ethnology, Bull. No. 54, Washington, 1913.

_____, Antiquities of the Jemez Plateau, Bulletin 32, Bureau of American Ethnology, Washington, D.C. 1906.

Historic Preservation Program, The, Publication of New Mexico State Planning Office, Santa Fe, 1973.

Hosea, H. G., Floods in the Rio Grande Through the Middle Valley and a Detailed Study of the Flood of September 21-23, 1929, unpublished and undated manuscript approved by the Middle Rio Grande Conservancy District, Albuquerque.

James, George W., Reclaiming the Arid West, New York, 1917.

Horlack, Jackson Levi and Hammonds, Sheep, Danville, Illinois, 1945.

Longacre, William A., Reconstructing Prehistoric Pueblo Societies, Albuquerque, 1970.

Moorhead, Max L., New Mexico's Royal Road: Trade and Travel on the Chihuahua Trail, Norman: University of Oklahoma Press, 1958.

Mumey, Nolie, Diary of Alonzo F. Ickis, NP, 1957

New Mexico Agricultural Statistics, Publication of United States Department of Agriculture, Statistical Reporting Service and New Mexico Department of Agriculture, New Mexico State University, Las Cruces.

New Mexico Historical Review, Quarterly Publication of the University of New Mexico, Albuquerque.

Pearce, T.M., Editor, New Mexico Place Names, A Geographical Dictionary, Albuquerque: University of New Mexico Press, 1965.

Publications in History, Publication of Socorro County Historical Society, Socorro, 6 Vols.

Reeve, Frank D., History of New Mexico, New York: Lewis Historical Publishing Company, Inc., 1961, 3 Vols.

Saunders, Lyle, Compiler, A Guide to Materials Bearing on Cultural Relations in New Mexico, Albuquerque: University of New Mexico Press, 1944.

Stamp, Dudley L., (Ed.), A History of Land Use in Arid Lands, UNESCO, 1961.

Stanley, F., Socorro - The Oasis, Denver: World Press, 1950.

Stevens, Montague, Meet Mr. Grizzly, Robert Hale Limited, Worcester, 1951.

Twitchell, Ralph E., Old Santa Fe, Chicago, 1963.

_____, The Spanish Archives of New Mexico, Cedar Rapids, 1914.

_____, The Leading Facts of New Mexico History, Albuquerque, Horn & Wallace, 1963, 2 Vols.

Vogt, Evan Z. and Ethel M. Albert, People of Rimrock, Harvard University Press, Cambridge, Mass., 1966.

United Nations, The Problems of the Arid Zone, Proceedings of the Paris Symposium, UNESCO, 1962.

Articles

Bourke, John M., "Notes on the Languages and Folk-usage of the Rio Grande Valley, with Special Regard to the Survivals of Arabic Custom", Journal of American Folklore, 9:115 (1896).

Clisby, Kathryn and Paul B. Sears, "San Augustin Plains - Pleistocene Climatic Changes", Science, 124, 537-539, September 1956.

Greever, William S., "Railway Development in the Southwest", New Mexico Historical Review, XXXII:178 (April, 1957).

Herrick, C. L., "Report of a Geological Reconnaissance in Western Socorro and Valencia Counties, New Mexico," The American Geologist, XXV:332 (June, 1900).

Hutchins, Wells A., "The Community Acequia: Its Origins and Development", Southwestern Historical Quarterly, 31:274 (1927-1928).

Lyons, Fern, "Catron County", New Mexico Magazine, Spring 1972.

Mangelsdorf, Paul C., "Ancestor of Corn", Science, 128, 1313-1320, 1958.

_____, "The Mystery of Corn", Scientific American, 183, 20-24, 1950.

Ogle, Ralph H., "Federal Control of the Western Apache, 1848-1886", New Mexico Historical Review, XV:242 (April, 1940).

Potter, Loren D., "Phytosociological Study of San Augustine Plains, New Mexico, Ecological Monographs, 27, 113-136, 1957.

_____, and Joanne Rowley, "Pollen Rain and Vegetation, San Augustin Plains, New Mexico", The Botanical Gazette, 122, 1-25, 1960.

Powers, William E., "Basin and Shore Features of the Extinct Lake, San Augustin, New Mexico", Jour. of Geomorphol., 2, 345-356, 1939.

Simmons, Marc., "Spanish Irrigation Practices in New Mexico", New Mexico Historical Review, XLVII:135-151 (April, 1972).

Stewart, Guy, "Conservation in Pueblo Agriculture", Scientific Monthly, 51:201-220 (Aug., 1940).

Stoes, K. D., "The Land of Shalam", New Mexico Historical Review, XXXIII:102-113 (April, 1958).

Westphall, Victor, "The Public Domain in New Mexico, 1854-1891", New Mexico Historical Review, XXXIII:132 (Jan., 1958).

Widdson, Jerold G., "Historic Geography of the Middle Rio Puerco Valley, New Mexico", New Mexico Historical Review, 34:257-261 (Oct., 1959).

Unpublished Material

Christiansen, Paige W., Visual Observations, Field Research in New Mexico, 1970-1973.

Pate, Virgil, Magdalena Livestock Driveway, in a report on the Socorro District, Bureau of Land Management in Roswell, New Mexico, August 5, 1963.

The Pecos Conference, Water Control Symposium, Xerox copies of the papers of the conference are at the Museum of New Mexico, Laboratory of Anthropology Library, Santa Fe, New Mexico.

Wilkening, Marvin, The Plains of San Augustin: Site of the VLA, Unpublished, undated manuscript (processed).

Appendix A

National Historic Register Sites - Socorro District

The Socorro District is literally covered with historic sites, including archeological Indian ruins, rock art (pictographs and petroglyphs), ghost towns, homes and buildings with a historical architecture and old roads and trails.

Unfortunately, some of the sites referred to above have already received damage, either from neglect or by vandalism and this will, no doubt, continue until effective action is undertaken to prevent it. Therefore, it is recommended that such sites be preserved from further damage where visitor access would be limited or inadvisable. Others that may have a possible visitor interest should be restored and made available for public sightseeing and other use.

Those included on the National Register of Historic Places as of December 31, 1974, are:

Catron County

Gila Cliff Dwellings National Monument, 47 miles north of Silver City.

Socorro County

Trinity Site, 25 miles south of U. S. 380 on White Sands Missile Range.

Gran Quivira National Monument, 1 mile east of Gran Quivira on New Mexico Road 10.

Gallinas Springs Ruin, 12 miles northeast of Magdalena.

Garcia Opera House, Terry Avenue and California Street, Socorro.

Fort Craig, 37 miles south of Socorro.

Sites included on the New Mexico State Register of Cultural Properties include:

Catron County

Apache Creek Ruin

Bat Cave

Gila Cliff Dwellings National Monument and Collections

Mogollon Ghost Town

T. G. & E. Route (Archeological Sites) (Also, Valencia County)

Tularosa Cave

Zuni Salt Lakes

Socorro County

Abeyta & Montoya House, Socorro

Baca, (Juan Jose) House, Socorro

Baca, (Severo) House, Socorro

Crown Mill, Socorro

Gallinas Springs Ruin

Garcia, (Juan Nepomuceno) House, Socorro

Garcia Opera House, Socorro

Gran Quivira National Monument and Collections

Illinois Brewery, Socorro

Mocking Bird Gap Archeological Site

Sandal Cave

Socorro Historic District, Socorro

Valencia County

Cebollita Ruin

T. G. & E. Route (Archeological Sites) (Also, Catron County)

Multi-County Sites

Camino Real (Valencia and Socorro counties)

Santa Fe to El Paso Stage Route (Valencia and Socorro counties)

New sites added to the New Mexico State Register of Historic Places are listed below:

Nick Ayon Saloon, Mogollon (Catron County)

Mogollon Village (Catron County)

Magdalena Stock Driveway (Catron and Socorro counties)

Socorro Plaza Historic District, Socorro (Socorro County)

Little Mission Church of St. John the Baptist, Kelly (Socorro County)

Appendix B - Personal Interviews

(All in New Mexico unless otherwise noted)

Mrs. Hope Anderson, Datil

Holm Bursum, Jr., Socorro

Mr. & Mrs. Roger Candelaria, Quemado

Mr. & Mrs. Frank Chavez, San Antonio

Mrs. Fay Few, Socorro

Leo Funk, Socorro

Bud Green, Socorro

Mrs. Elizabeth Kelly, Magdalena

Mr. & Mrs. Tom Kelly, Magdalena

Ira L. Mauldin, Socorro

Antonio J. Mirabal, Socorro

Miss Gail Qunonez, Springerville, Arizona

James E. Reeves, Socorro

John Reiche, Socorro

Mrs. Buford Richardson, Socorro

Mrs. Dolores Salazar, Quemado

Mrs. Betty Shead, Albuquerque

Spencer Wilson, Socorro

This intern report was read and accepted by a staff member at:

Agency: Bureau of Land Management-Socorro District

Address: 200 Neel Avenue
Socorro, New Mexico 87801

This report was completed by a WICHE intern. This intern's project was part of the Resources Development Internship Program administered by the Western Interstate Commission for Higher Education (WICHE).

The purpose of the internship program is to bring organizations involved in community and economic development, environmental problems and the humanities together with institutions of higher education and their students in the West for the benefit of all.

For these organizations, the intern program provides the problem-solving talents of student manpower while making the resources of universities and colleges more available. For institutions of higher education, the program provides relevant field education for their students while building their capacity for problem-solving.

WICHE is an organization in the West uniquely suited for sponsoring such a program. It is an interstate agency formed by the thirteen western states for the specific purpose of relating the resources of higher education to the needs of western citizens. WICHE has been concerned with a broad range of community needs in the West for some time, insofar as they bear directly on the well-being of western peoples and the future of higher education in the West. WICHE feels that the internship program is one method for meeting its obligations within the thirteen western states. In its efforts to achieve these objectives, WICHE appreciates having received the generous support and assistance of the Economic Development Administration; the Jessie Smith Noyes Foundation; the National Endowment for the Humanities; the Wyoming Office of Manpower Planning; and of innumerable local leaders and community organizations, including the agency that sponsored this intern project.

For further information, write Bob Hullinghorst, Director, Resources Development Internship Program, WICHE, P.O. Drawer 'P', Boulder, Colorado 80302 or call (303) 492-7177.

3773-38214530000045700:
1C:376:WICHE:2H300

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225